DATA MANAGEMENT COPY

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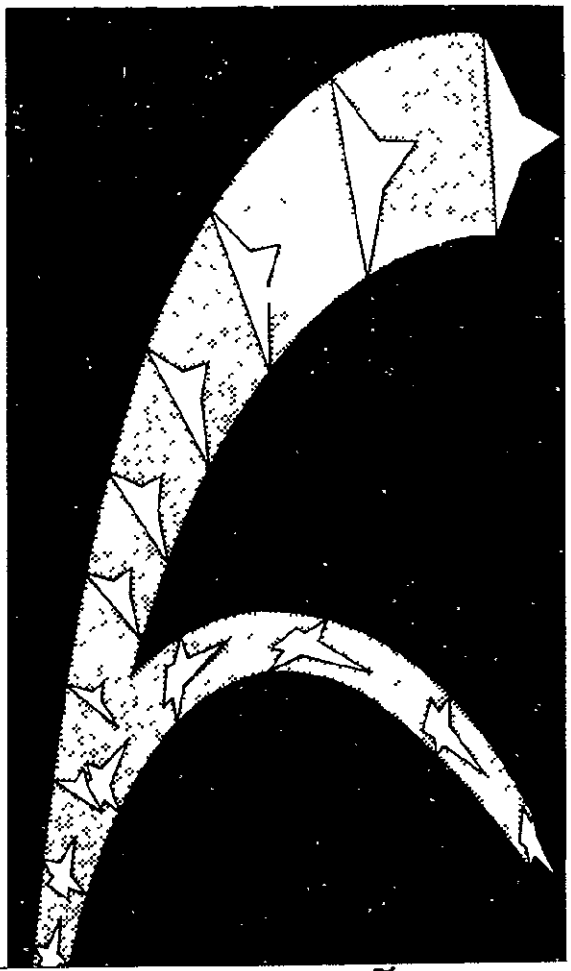

—SPACE SHUTTLE—

MODEL S-5 NASA/MSC ORBITER SHUTTLE INVESTIGATION OF THE EFFECTS OF VERTICAL TAIL, AND GEOMETRY ON DIRECTIONAL STABILITY

TEXAS A & M
LOW SPEED
WIND TUNNEL TEST RESULTS
DATA REPORT

FEBRUARY 1971
CONTRACT NAS8-4016
SCHEDULE II
DRL 184-58

SADSAC SPACE SHUTTLE
AEROTHERMODYNAMIC
DATA MANAGEMENT SYSTEM

AMENDMENT 130

MARSHALL
SPACE FLIGHT CENTER

SPACE DIVISION CHRYSLER CORPORATION

DMS-DR-1062

February, 1971

SADSAC/SPACE SHUTTLE

WIND TUNNEL TEST DATA REPORT
(MSC TEST SERIES XXXVIII)

CONFIGURATION MODEL S-5, NASA/MSC ORBITER SHUTTLE (0.01875 SCALE)

TEST PURPOSE INVESTIGATION OF THE EFFECTS OF VERTICAL TAIL, AND GEOMETRY ON DIRECTIONAL STABILITY

TEST FACILITY TEXAS A&M LOW SPEED WIND TUNNEL

TESTING AGENCY NASA/MANNED SPACECRAFT CENTER

TEST NO & DATE MSC S-38, 8 THROUGH 15 JULY 1970

TEST CONDUCTOR(S) DAVID L. EICHBLATT

DATA MANAGEMENT SERVICES

LIAISON for G. G. McDONALD

DATA OPERATIONS W. R. MORGAN

RELEASE APPROVAL

N. D Kemp, Supervisor
Aero Thermo Data Group

GOVERNMENT FIELD PRINTING PLANT
MICHOUD ASSEMBLY FACILITY 1971
NEW ORLEANS, LOUISIANA 70129

NASA-M FC-MAF

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ABSTRACT

A 0.01875 scale model (model S-5) of a preliminary version of the NASA/MSC orbiter shuttle configuration was tested (MSC test series S-XXXVIII) in the Texas A&M University Low Speed Wind Tunnel on 8-10 July and 30-31 July, 1970. The purpose of the test was to determine the effects of changes in the aspect ratio, leading and trailing edge sweep angles, and area of the vertical tail on the directional stability of the vehicle. Forty-one vertical tails were used in this test program. The data are reduced about the center of gravity located at .60 of the body length This test was conducted at a Mach number of 0.25 and a Reynolds number of 1.7×10^6 per foot. The model was basically tested at an angle of attack of 2 degrees over a sideslip range of 0 to 10 degrees. Some angle of attack excursions and sideslip sweeps from -10 to 10 degrees were made in the preliminary stages of testing.

TEST FACILITY DESCRIPTION

The Texas A&M University Low Speed Wind Tunnel is a continuous closed circuit horizontal single return facility The overall circuit length is 397.5 feet, the tunnel is constructed of steel supported above the ground on concrete pillars The rectangular 7 foot by 10 foot test section is 16 feet long, and it is operated at atmospheric pressure through a speed range from zero to 300 feet per second. The tunnel is powered by a 1250 KVA synchronous electric motor which drives a 12½-foot diameter Curtiss Electric propeller, the controls for the motor and its auxiliaries are located in the control room. Cooling of the tunnel circuit during warm weather is accomplished by spraying the outside of the tunnel shell with water, this keeps the tunnel circuit temperature within 10°F of ambient temperatures to protect models and to maintain tolerable test section working conditions for model configuration changes. The 7 x 10 test section incorporates an external pyramid balance system which separates and independently measures the aerodynamic components, a variety of support systems for this balance are available. Internal balances are also available for use in this tunnel. For a more detailed description of this tunnel refer to the Low Speed Wind Tunnel Facility Handbook published by the Space Technology Division, Texas A&M University, College Station, Texas

TABLE 1

TEST CONDITIONS
TEST S-38

MACH NUMBER	REYNOLDS NUMBER per foot	DYNAMIC PRESSURE (pounds/sq ft.)	STAGNATION TEMPERATURE (degrees Fahrenheit)
.25	1.7×10^6	91	95

BALANCE UTILIZED. TASK 1.25 MK XIII interal balance

	CAPACITY	ACCURACY·	COEFFICIENT TOLERANCE
NF	500 lbs	.5% max load	
SF	500 lbs		
AF	150 lbs		
PM	2625 in-lbs		
YM	2125 in-lbs		
RM	120 in-lbs		

COMMENTS

DATA REDUCTION

Forces and moments were measured by an internal strain gage balance in the body axis system and have been reduced to coefficient form utilizing the following reference values:

$S_{REF} = S$ = wing planform area = .321 ft^2

$l_{REF} = \bar{c}$ = wing mean aerodynamic chord = .23 ft

b = wing span = 1.5 ft

Axial force was not corrected for model base pressure effects nor have the data been corrected for tunnel effects.

Moment coefficients are referenced about a point 15.52 inches from the nose of the model. This corresponds to 60% of the body length All data are presented in the body axis system

CONFIGURATIONS INVESTIGATED

NOMENCLATURE

B1 = Baseline fuselage MSC orbiter S-5 (August 1969 configuration)

W1 = Wing MSC orbiter S-5 (May 1969 configuration)

V3 = Vertical tail MSC configuration)

H6 = Horizontal stabilizer MSC orbiter S-5 (August 1969 configuration)

The model component dimensional data are found on the following pages, 28 through 22

CONFIGURATIONS TESTED

$B_1W_1H_6$

$B_1W_1H_6V_3$

$B_1W_1H_6V_{101 \rightarrow 141}$

Figures 1 and 2 are drawings of the basic configuration ($B_1W_1H_6V_3$) and tunnel installation. These drawings are not drawn to scale. With the exception of V_3 all of the vertical tails tested were flat plates with a rounded leading edge and a tapered trailing edge In Table 2 the planform characteristics are presented.

TEST S-28 DATA SET COLLATION SHEET

☐ PRETEST
☑ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	TYPE		CONTROL DEFLECTION				NO. OF RUNS	MACH NUMBERS 0.25
RG70 02	B1W1H6	A	-5					1	2
03	B1W1H6	A	-5						3
04	B1W1H6	B	-5						4
05	B1W1H6	B	-5						5
06	B1W1H6	B	-5						6
07	B1W1H6	A	-5	VERTICAL TAIL					7
08	B1W1H6	A	-5	PARAMETERS:					8
09	B1W1H6	C	-5	DATA AR	LE				9
10	B1W1H6 V111	C	-5	200	1	45	15		10
11	V111	A	-5						11
12	V111	A	-5						12
13	V111	B	-5						13
14	V111	B	-5						14
15	V111	B	-5						15
16	V102	C	-5		.5				16
17	V102	C	-5		.5				17
18	V120	C	-5		2				18
19	V120	C	-5		2				19
20	V101	C	-5		.5		0		20

1 7 11 19 25 31 37 43 49 55 61 67 73 76

CA CY CN CLL CLM CLN

COEFFICIENTS a or b SCHEDULES

A X = 0, 2, 4, 6, 8, 10

B R = 10

C R = 1

←IDPVAR(1) IDPVAR(2), NDV

TEST S-38 DATA SET COLLATION SHEET

☐ PRETEST
☑ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD α	SCHD β	CONTROL DEFLECTION AREA	CONTROL DEFLECTION AR	CONTROL DEFLECTION LE SWEEP	CONTROL DEFLECTION TE SWEEP	NO of RUNS	MACH NUMBERS 0.25
RG70 21	B1W1H6 V103	2	C	200	3	45	30	1	21
22	V 104					30	0		22
23	V 105					30	15		23
24	V 106					30	30		24
25	V 107					15	0		25
26	V 108					15	15		26
27	V 109					0	0		27
28	V 110				1	45	0		28
29	V 112					45	30		29
30	V 113					30	0		30
31	V 114					30	15		31
32	V 115					30	30		32
33	V 116					15	0		33
34	V 117					15	15		34
35	V 118					0	0		35
36	V 119				2	45	0		36
37	V 121					45	30		37
38	V 122					30	0		38
39	V 123					30	15		37
40	V 124					30	30		40

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CA CY CN CRL CLM CYN

IDPVAR(1) | IDPVAR(2) | NDV

COEFFICIENTS α or β SCHEDULES

A α = 0, 2, 4, 6, 8, 10

B β = -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10

C β = 0, 2, 4, 6, 8, 10

TEST S-38 DATA SET COLLATION SHEET

☐ PRETEST
☑ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD α	SCHD β	CONTROL DEFLECTION AREA	AR	LE SWEEP	TE SWEEP	NO of RUNS	MACH NUMBERS 0.25
RG70 41	B1W1H6 V125	2	C	200	2	15	0	1	41
42	V126			200	2	15	15		42
43	V127			200	2	0	0		43
44	V128			100	1	0	0		44
45	V129			300	1	0	0		45
46	V130		↓	500	1	0	0		46
47	V111		B	200	1	45	15		47
48	V3		B	2462	.98	45	15		48
49	V102		C	200	.5	45	15		49
50	V111			200	1	45	15		50
51	V114			200	1	30	15		51
52	V117			200	1	15	15		52
53	V120			200	2	45	15		53
54	V133			300	1	45	15		54
55	V134			300	2	45	15		55
56	V135			400	1	45	15		56
57	V136			400	2	45	15		57
58	V137			500	1	45	15		58
59	V138			500	2	45	15		59
60	V139	↓	↓	600	1	45	15	↓	60

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CA ICY ICN CBL CLM CYN

COEFFICIENTS
α or β
SCHEDULES

A α = 0, 2, 4, 6, 8, 10
B β = -10, -8, -6, -4, -2, 0, 2, 4, 6, 8
C β = 0, 2, 4, 6, 8, 10

IDPVAR(1) IDPVAR(2) NDV

TEST S-38. DATA SET COLLATION SHEET

☐ PRETEST
☑ POSTTEST

DATA SET IDENTIFIER	CONFIGURATION	SCHD		CONTROL DEFLECTION				NO of RUNS	MACH NUMBERS											
		α	β	AREA	AR	LE SWEEP	TE SWEEP		0.25											
RG7061	B1W1H6 V146	2	C	600	2	45	15	1	61											
RG7062	B1W1H6	2	C	—	—	—	—	1	62											
RG7063	B1W1H6V141	2	C	200	1.5	45	15	1	63											

1 7 13 19 25 31 37 43 49 55 61 67 75 76

CA CY ICN CBL ICLM CYN → IDPVAR(1) | IDPVAR(2) | NDV

COEFFICIENTS α or β SCHEDULES

A α = 0, 2, 4, 6, 8, 10

B β = -10, -8, -6, -4, -2, 0, 2, 4, 6, 8, 10

C β = 0, 2, 4, 6, 8

FLST 5-38 DATA SET DESCRIPTOR SHEET

DATA SET IDENTIFIER	DATA SET DESCRIPTOR	Code	CURVE SLOPE RANGE	
			LOWER LIMIT	UPPER LIMIT
RG70 02	MSC S-5 MODEL B1.4H1.6	11		
03		11		
04		21		
05				
06				
07				
08				
09				
10	V.1.1.1			
11	V.1.1.1			
12	V.1.1.1			
13	V.1.1.1			
14	V.1.1.1			
15	V.1.1.1			
16	V.1.0.2			
17	V.1.02			
18	V.1201			
19	V.120			
20	V.1911			

1 SREF(1)	11 SREF(2)	21 LREF(1)	31 LREF(2)	41 BREF(1)	51 BREF(2)	61 XMRP(1)	71 XMRP(2)
0.320	FT.2	.23	FT	1.5	FT	15.52	IN

YMRP(1)	YMRP(2)	ZMRP(1)	ZMRP(2)	SCALE(1)	SCALE(2)	FILREF
0.0	IN	2.4	IN	1.875	PCT	

10

LIST S-38 DATA SET DESCRIPTOR SHEET

DATA SET IDENTIFIER	DATA SET DESCRIPTOR (1 … 11 … 21 … 31 …)	Index Req	CURVE SLOPE RANGE LOWER LIMIT	61 UPPER LIMIT
RG7021	MSC S-S MODEL B1W1H6V103	21		
22	V104			
23	V105			
24	V106			
25	V107			
26	V108			
27	V109			
28	V110			
29	V121			
30	V113			
31	V114			
32	V115			
33	V116			
34	V117			
35	V118			
36	V119			
37	V121			
38	V124			
39	V123			
40	V124			

1 SREF(1)	11 SREF(2)	1 LREF(1)	31 LREF(2)	41 BREF(1)	51 BREF(2)	61 XMRP(1)	71 XMRP(2)
0.320	FT	23	FT	1.5	FT	15.52	IN

YMRP(1)	YMRP(2)	ZMRP(1)	ZMRP(2)	SCALE(1)	SCALE(2)	FILREF
0.0	IN	2.4	IN	1.875	PCT	

TEST S-38 DATA SET DESCRIPTOR SHEET

DATA SET IDENTIFIER	DATA SET DESCRIPTOR (1 / 11 / 21 / 31 / 41)	Node Type	CURVE SLOPE RANGE 51 LOWER LIMIT	61 UPPER LIMIT
RG7041	M.S.C. S-S MODEL B,W,H,V,1,25	21		
42	V,1,26			
43	V127			
44	V128			
45	V129			
46	V130			
47	V,1,1,1			
48	V3			
49	V102			
50	V1,1,1			
51	V,1,1,4			
52	V,1,1,7			
53	V1,2,9			
54	V133			
55	V134			
56	V135			
57	V,1,3,6			
58	V,1,3,7			
59	V,1,3,8			
60	V139			

1 SREF(1)	11 SREF(2)	21 LREF(1)	31 LREF(2)	41 BREF(1)	51 BREF(2)	61 XMRP(1)	71 XMRP(2)
0.320	INCH	23	FT	1.5	FT	1.5.52	IN

YMRP(1)	YMRP(2)	ZMRP(1)	ZMRP(2)	SCALE(1)	SCALE(2)	FILREF
0.0	IN	24	IN	1.875	PCT	

TEST S-38 DATA SET DESCRIPTOR SHEET

DATA SET IDENTIFIER	DATA SET DESCRIPTOR 1 11 21 31 41	Mode Type	CURVE SLOPE RANGE 51 LOWER LIMIT	61 UPPER LIMIT
RG70 01	MSC S-5 MODEL B1W1H6V140	21		
RG70 02	MSC S-5 MODEL B1W1H6	21		
RG70 03	MSC S-5 MODEL B1W1H6V191	21		

1 SREF(1)	11 SREF(2)	21 LREF(1)	31 LREF(2)	41 BREF(1)	51 BREF(2)	61 XMRP(1)	71 XMRP(2)
0.320	FT	.23	FT	1.5	FT	15.52	IN

YMRP(1)	YMRP(2)	ZMRP(1)	ZMRP(2)	SCALE(1)	SCALE(2)	FILREF
0.0	IN	3.4	IN	1.875	PCT	

DATA SET PARAMETER NAME SHEET

S - 38

DATA SET IDENTIFIER	PARAMETER NAMES (Format 10A6) 1 7 13 19 25 31 37 43 49 55	NPRA 61
RG70 02	B,E,T,A,	
03	B,E,T,A,	
04	A,L,P,H,A,	
05		
06		
07		
08		
09		
10	A,R,E,A, ,A,S,P,E,C,T, ,S,W,E,E,P, ,T,S,W,E,E,P, ,A,L,P,H,A,	
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

DATA SET, PARAMETER NAME SHEET

TEST S-38

DATA SET IDENTIFIER	PARAMETER NAMES (Format 10A6) 1 7 13 19 25 31 37 43 49 55 61	NPRA
RG70 21	AREA, ASPECT, SWEEP, TSWEEP, ALPHA,	
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
32		
33		
34		
35		
36		
37		
38		
39		
40		

DATA SET PARAMETER NAME SHEET

TEST S-38

DATA SET IDENTIFIER	PARAMETER NAMES (Format 10A6) 1 7 13 19 25 31 37 43 49 55	NPRA 61
RG7041	AREA ASPECTLSWEEPTSWEEPALPHA	
42		
43		
44		
45		
46		
47		
48		
49		
50		
51		
52		
53		
54		
55		
56		
57		
58		
59		
60		

DATA SET PARAMETER NAME SHEET

TEST S-38

DATA SET IDENTIFIER	PARAMETER NAMES (Format 10A6) 1 7 13 19 25 31 37 43 49 55	NPRA 61
RG7061	AREA, ASPECTLSWEEPTSWEEPALPHA,	
RG7062	ALPHA,	
RG7063	AREA, ASPECTLSWEEPTSWEEPALPHA,	

DATA SET PARAMETER VALUE SHEET

TEST 5-38

DATA SET IDENTIFIER	PARAMETER VALUE (Format 10F8 3) 1 9 17 25 33 41 49 51 65 73
RG7002	-5.0
03	-10.0
04	10.0
05	8.0
06	6.0
07	4.0
08	2.0
09	0.0
10	200.0 1.0 45.0 15.0 0.0
11	2.0
12	4.0
13	6.0
14	8.0
15	10.0
16	0.5 45.0 15.0 1.0
17	0.5 45.0 15.0 2.0
18	2.0 45.0 15.0 2.0
19	2.0 45.0 15.0 10.0
20	.5 45.0 0.0 2.0

DATA SET PARAMETER VALUE SHEET

TEST S-38

DATA SET IDENTIFIER	PARAMETER VALUE (Format 10F8 3) 1 9 17 25 33 41 49 51 65 73
RG7021	200.0 .5 45.0 30.0 2.0
22	5 30.0 0.0
23	.5 30.0 15.0
24	.5 30.0 30.0
25	5 15.0 0.0
26	.5 15.0 15.0
27	.5 0.0 0.0
28	1.0 45.0 0.0
29	1.0 45.0 30.0
30	1.0 30.0 0.0
31	1.0 30.0 15.0
32	1.0 30.0 30.0
33	1.0 15.0 0.0
34	1.0 15.0 15.0
35	1.0 0.0 0.0
36	2.0 45.0 0.0
37	2.0 45.0 30.0
38	2.0 30.0 0.0
39	2.0 30.0 15.0
40	2.0 30.0 30.0

DATA SET PARAMETER VALUE SHEET

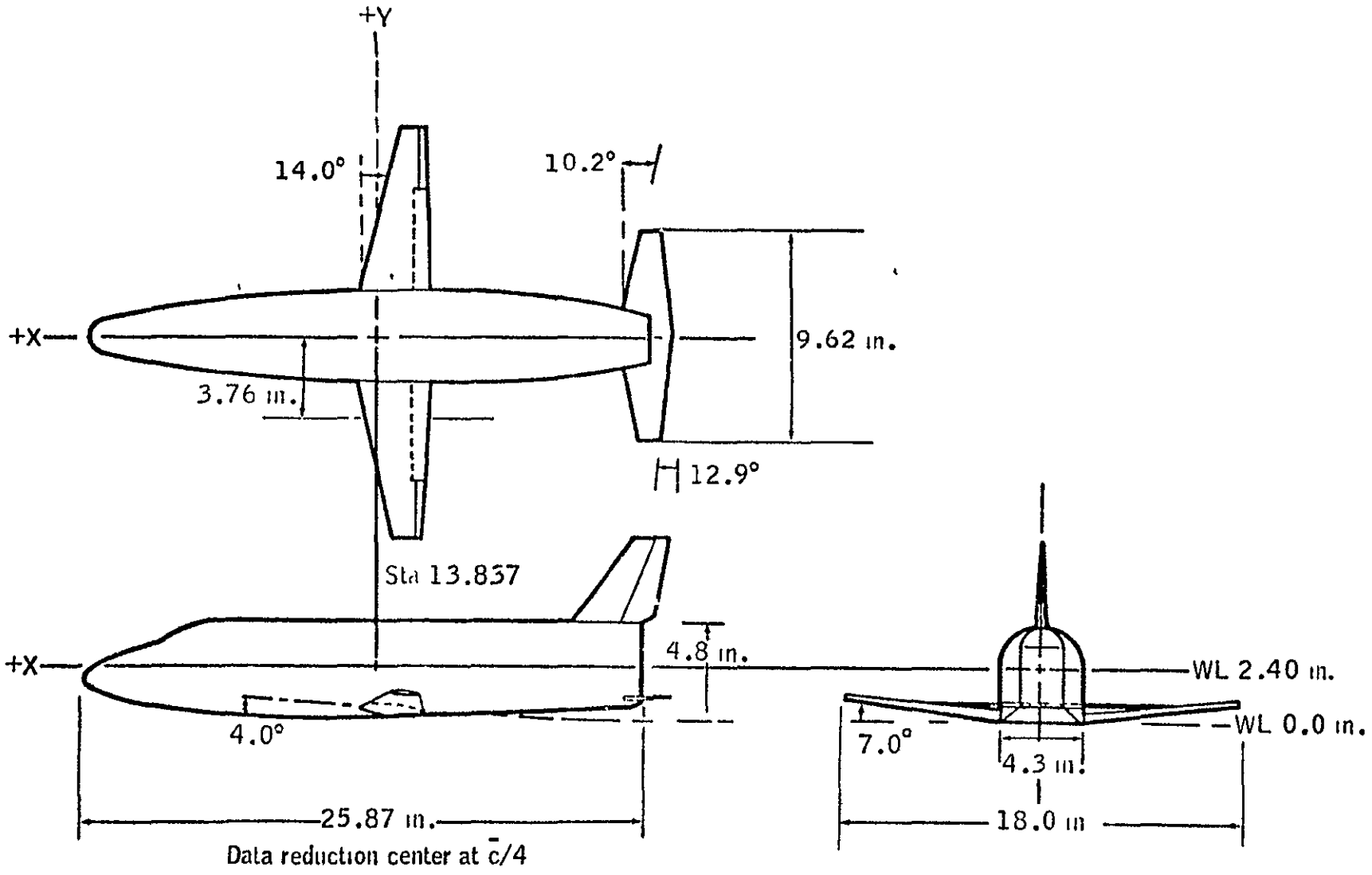
TEST S-38

DATA SET IDENTIFIER	PARAMETER VALUE (Format 10F8 3) 1 9 17 25 33 41 49 51 65 73
RG7041	200.0 3.0 15.0 0.0 2.0
42	200.0 2.0 15.0 15.0
43	200.0 2.0 0.0 0.0
44	100.0 1.0 0.0 0.0
45	300.0 1.0 0.0 0.0
46	500.0 1.0 0.0 0.0
47	200.0 1.0 45.0 15.0
48	241.3 0.98 45.0 15.0
49	200.0 .5 45.0 15.0
50	200.0 1.0 45.0 15.0
51	200.0 1.0 30.0 15.0
52	200.0 1.0 15.0 15.0
53	200.0 2.0 45.0 15.0
54	300.0 1.0 45.0 15.0
55	300.0 2.0 45.0 15.0
56	400.0 1.0 45.0 15.0
57	400.0 2.0 45.0 15.0
58	500.0 1.0 45.0 15.0
59	500.0 2.0 45.0 15.0
60	600.0 1.0 45.0 15.0

DATA SET PARAMETER VALUE SHEET

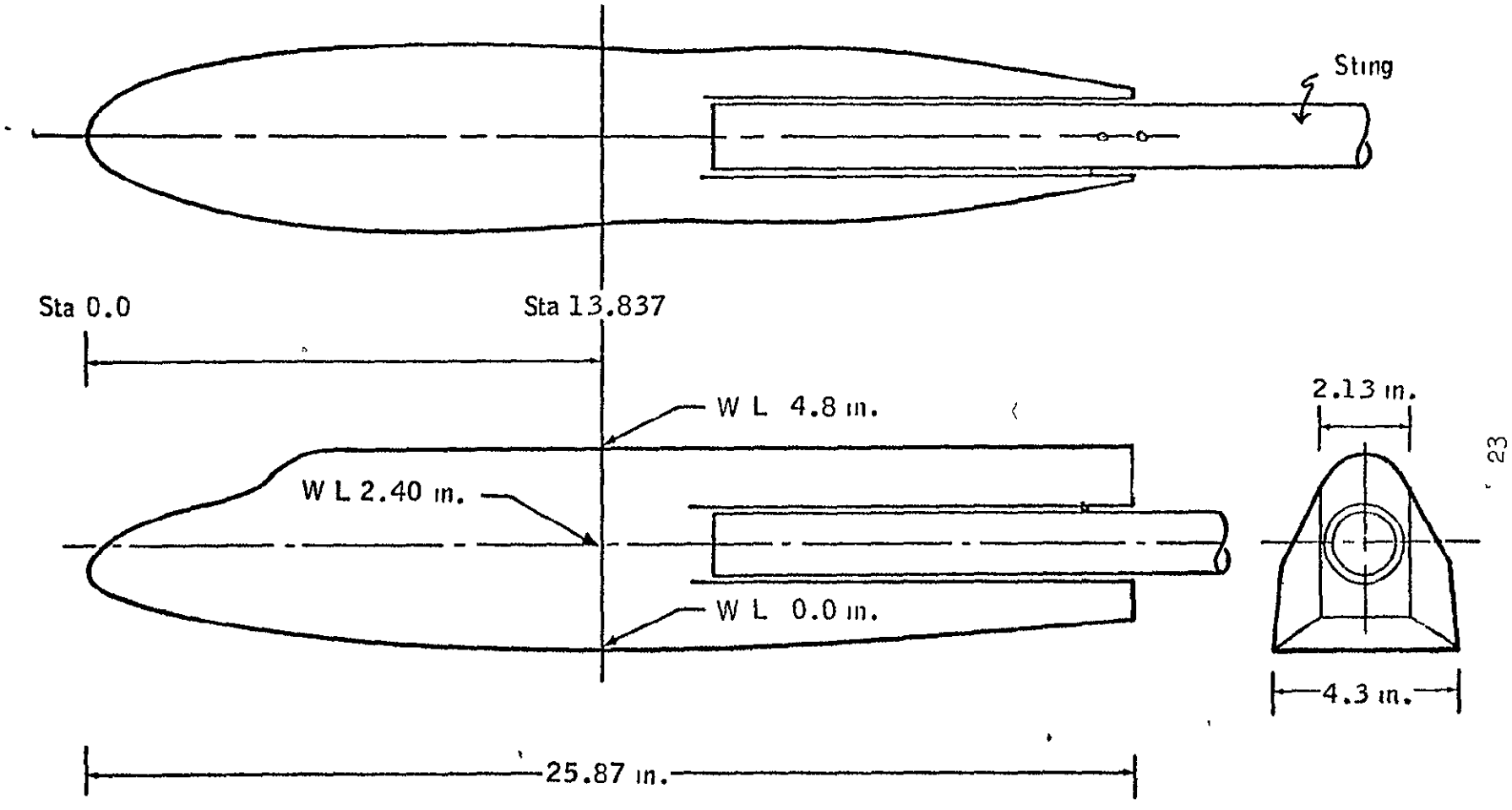
TEST S-38

DATA SET IDENTIFIER	PARAMETER VALUE (Format 10F8 3) 1	9	17	25	33	41	49	51	65	73
RG7061	600.0	2.0	45.0	15.0	2.0					
RG7062	30									
RG7063	200.0	1.5	45.0	15.0	2.0					



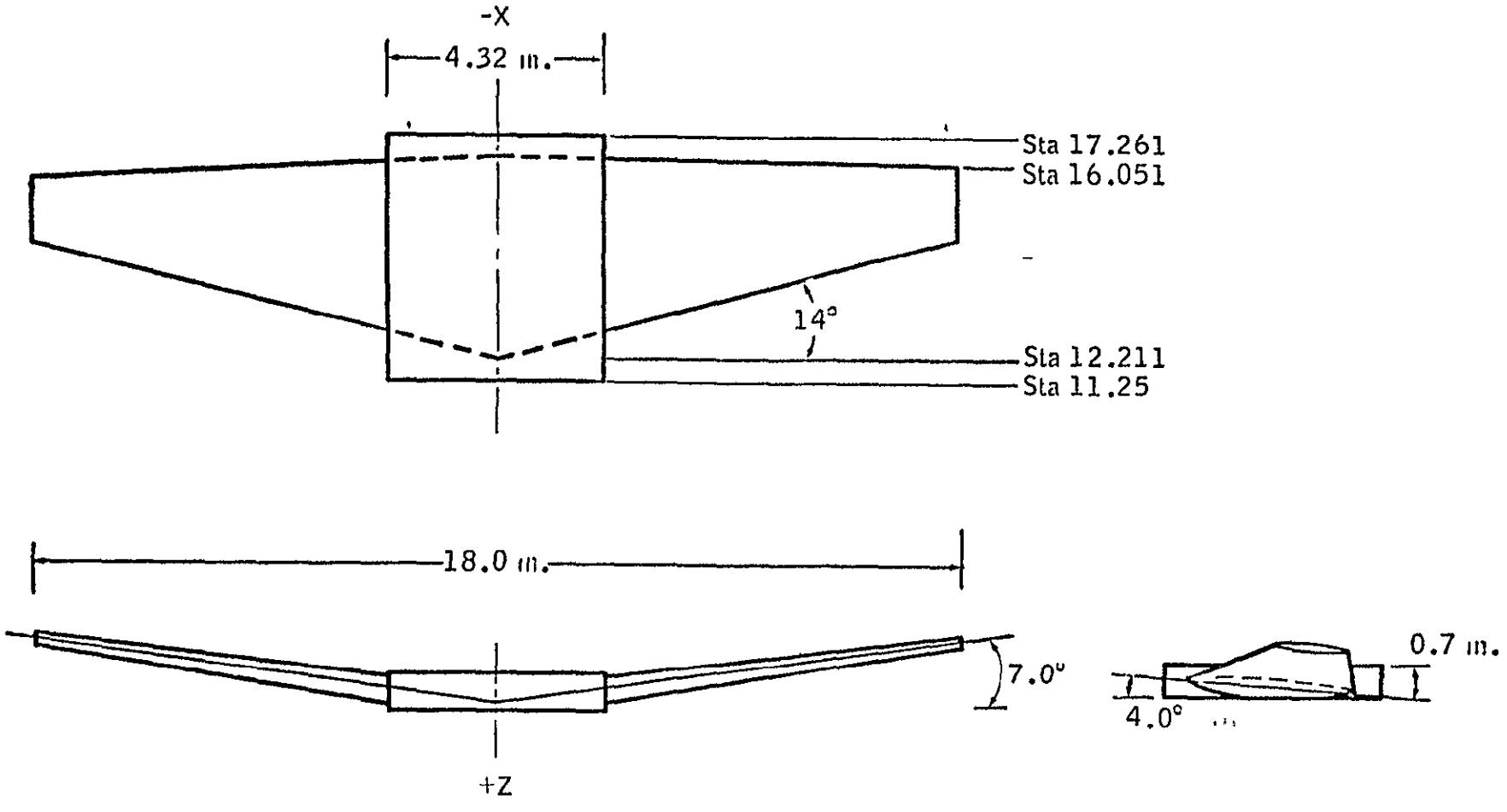
(a) Configuration $B_1W_1V_3H_6$.

Figure 1.- Model S-5, 0 01875 scale model of the MSC orbiter shuttle base-line configuration



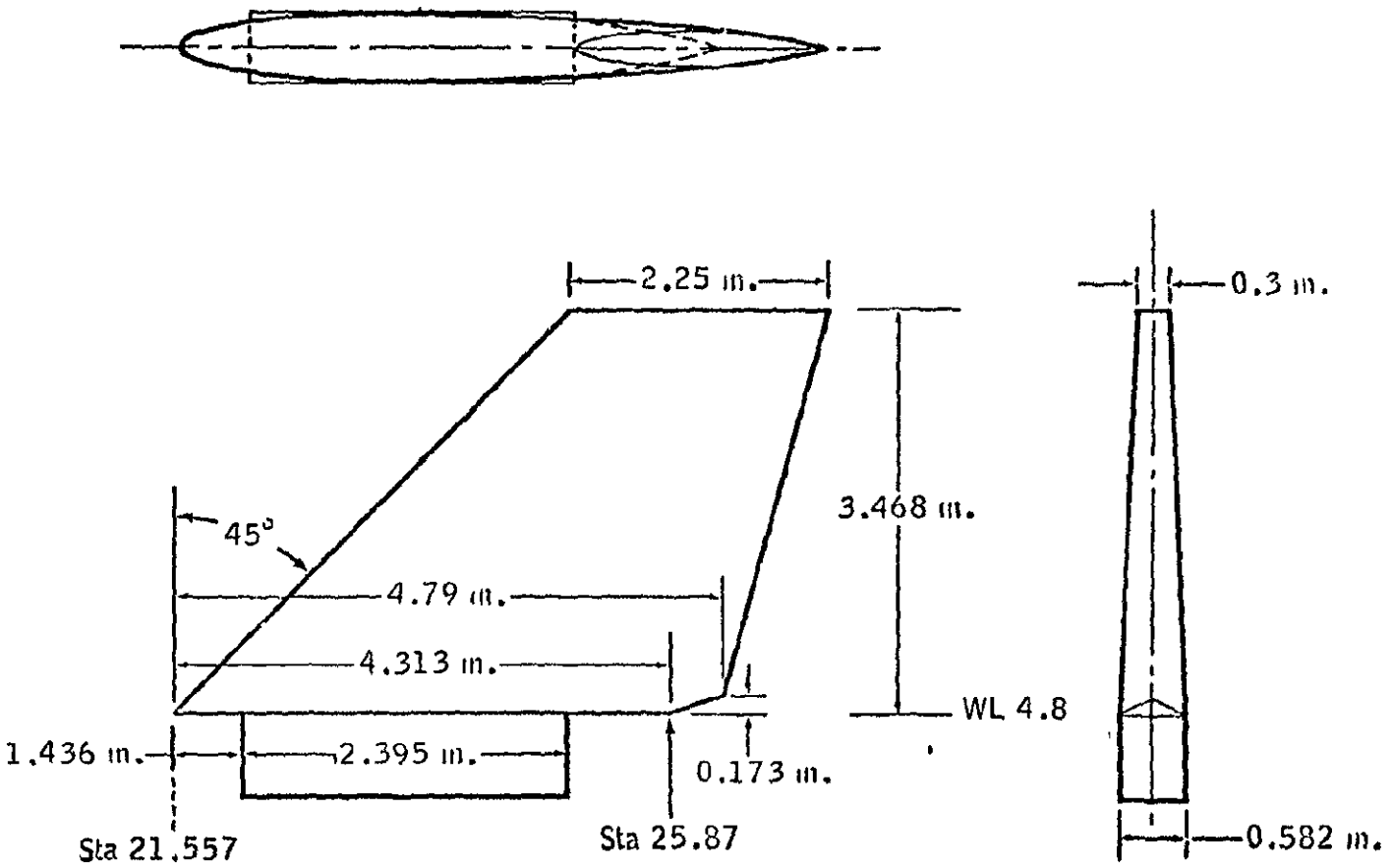
(b) Fuselage (B_1)

Figure 1 - Continued



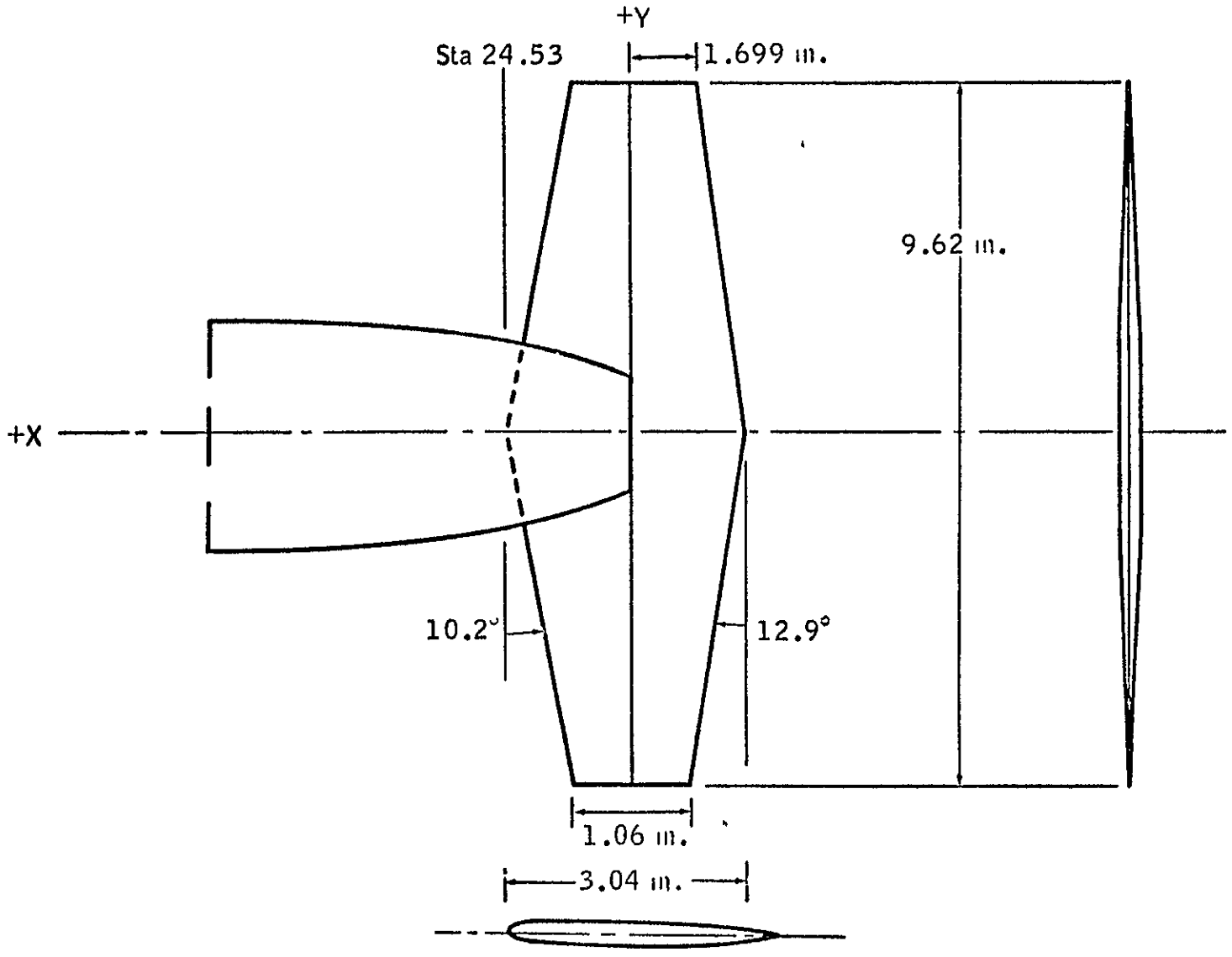
(c) Wing (W_1).

Figure 1.- Continued.



(d) Vertical stabilizer (V_3).

Figure 1 - Continued



(e) Horizontal stabilizer (H_6).

Figure 1 - Concluded

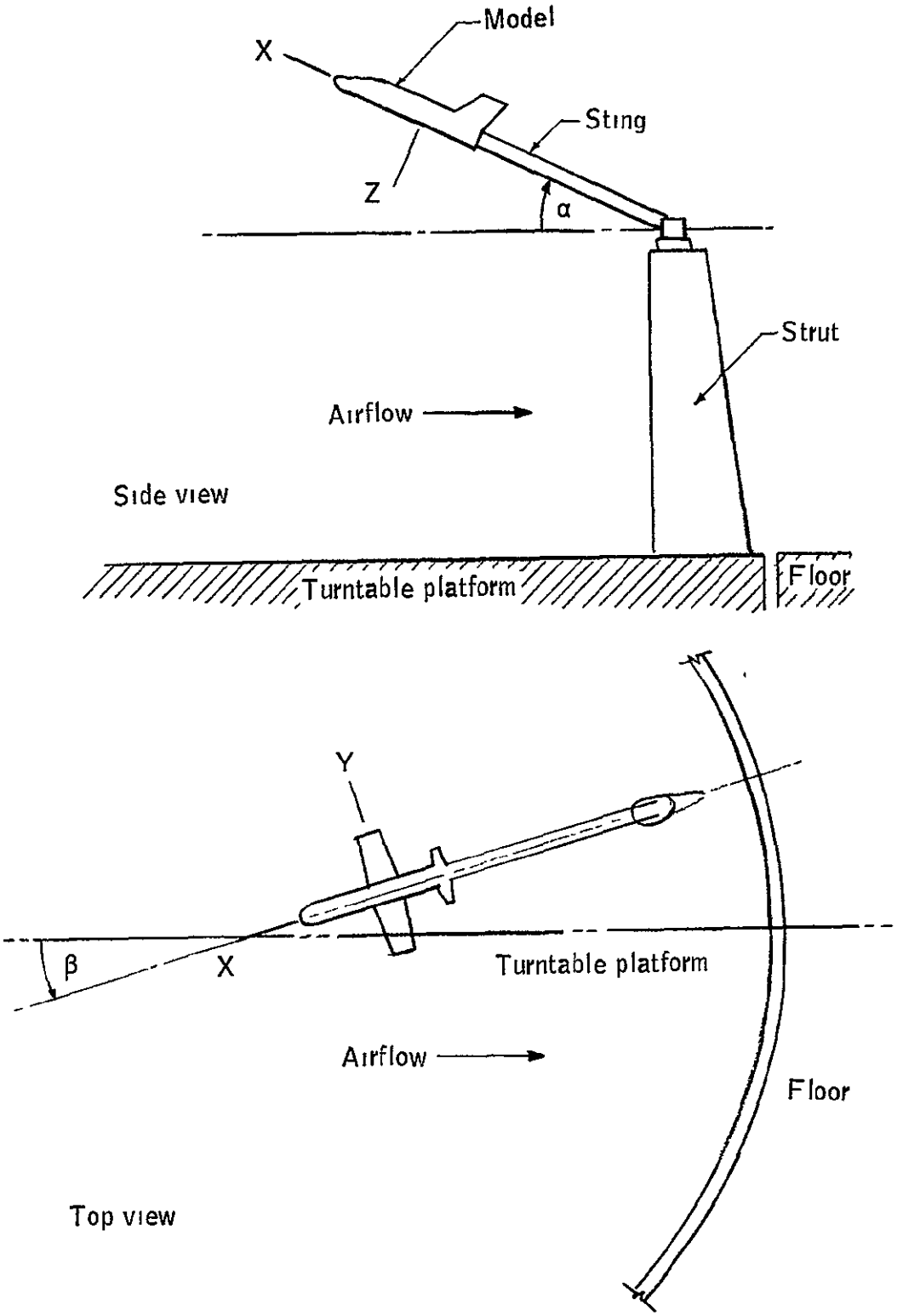


Figure 2.- Model installation in the test section at Texas A. and M. University's Low Speed Wind Tunnel.

MODEL COMPONENT: BODY - B1

GENERAL DESCRIPTION MSC ORBITER S-5 .01875 SCALE

DRAWING NUMBER SOY 37100150

DIMENSIONS	FULL-SCALE FT	MODEL SCALE IN
Length	115	25.87
Max Width	19.1667	4.3
Max Depth	21.333	4.8
Fineness Ratio	6 00	6.00
Area		
Max Cross-Sectional	3080	0.1335
Planform	—	—
Wetted	—	—
Base	160.3	0.0563

MODEL COMPONENT. WING W1

GENERAL DESCRIPTION 0.01875 Scale MSC ORBITER S-3

DRAWING NUMBER SIDY37100106

DIMENSIONS	FULL-SCALE	MODEL SCALE
TOTAL DATA		
Area, FT^2		
Planform	916.6	.321
Wetted	1295 0	.455
Span (equivalent) FT	80.0	1.5
Aspect Ratio	7.03	7.03
Rate of Taper	0.285	.285
Taper Ratio	.33	.33
Diehedral Angle, degrees	7.0	7.0
Incidence Angle, degrees	4.0	4.0
Aerodynamic Twist, degrees	0.0	0.0
Toe-In Angle	—	—
Cant Angle	—	—
Sweep Back Angles, degrees		
Leading Edge	14.0	14.0
Trailing Edge	-2 01	-2.01
O 25 Element Line	10.05	10.05
Chords INCHES		
Root (Wing Sta 0.0)	204 8	3,84
Tip, (equivalent)	68,3	1.28
MAC	148,3	2,773
Fus. Sta of 25 MAC	738.0	13.837
W P of 25 MAC	200.5	3.76
B L of 25 MAC		
Airfoil Section		
Root	NACA 0014-64	0014-64
Tip	NACA 0010-64	0010-64
EXPOSED DATA		
Area, FT^2	611.6	.215
Span, (equivalent) FT	60.8	1.14
Aspect Ratio	6.04	6.04
Taper Ratio	0.394	.394
Chords INCHES		
Root	173.3	3.25
Tip	68.3	1.28
MAC	141.1	2.645
Fus. Sta of .25 MAC	674.3	12.644
W.P. of 25 MAC	272	5.1
B L. of 25 MAC		

MODEL COMPONENT. HORIZONTAL TAIL (H6)

GENERAL DESCRIPTION NSC ORBITER S-5 , .01875 SCALE

DRAWING NUMBER SGY371000B6

DIMENSIONS		FULL-SCALE	MODEL SCALE
TOTAL DATA			
Area IN^2			
Planform		56234.7	19.77
Wetted		—	—
Span (equivalent) IN		513.07	9.62
Aspect Ratio		4.68	4.08
Rate of Taper		—	—
Taper Ratio		0.353	0.353
Dihedral Angle, degrees		0.0	0.0
Incidence Angle, degrees		0.0	0.0
Aerodynamic Twist, degrees		0.0	0.0
Toe-In Angle		—	—
Cant Angle		—	—
Sweep Back Angles, degrees			
Leading Edge		10.2	10.2
Trailing Edge		-12.9	-12.9
0 25 Element Line		4.5	4.5
Chords IN			
Root (Wing Sta 0.0)		162.13	3.04
Tip, (equivalent)		57.23	1.073
MAC		118.03	2.213
Fus Sta of 25 MAC		1327.5	24.89
Y STA. .25 MAC		108.95	2.024
B L of .25 MAC		—	—
Airfoil Section			
Root	NACA	0012-64	0012-64
Tip	NACA	0012-64	0012-64

MODEL COMPONENT VERTICAL TAIL V3

GENERAL DESCRIPTION .0175 SCALE MSC ORBITER S-5

DRAWING NUMBER SGY37100098

DIMENSIONS		FULL-SCALE	MODEL SCALE
EXPOSED DATA			
Area			
Planform		34704.0	12.2
Wetted		—	—
Span (equivalent)		290.0	6.936
Aspect Ratio		3.94	3.94
Rate of Taper		—	—
Taper Ratio		0.47	0.47
Dihedral Angle, degrees		0.0	0.0
Incidence Angle, degrees		0.0	0.0
Aerodynamic Twist, degrees		0.0	0.0
Toe-In Angle		—	—
Cant Angle		—	—
Sweep Back Angles, degrees			
Leading Edge		45.0	45.0
Trailing Edge		15.0	15.0
0.25 Element Line		42.5	42.5
Chords			
Root (Wing Sta 0.0)		255.5	4.79
Tip, (equivalent)		120.0	2.25
MAC		195.8	3.672
Fus Sta of .25 MAC		1231.0	23.092
IZ STA. .25 MAC		337.3	6.325
B L of 25 MAC			
Airfoil Section			
Root	NACA	0012-64	0012-64
Tip	NACA	0012-64	0012-64

TABLE 2 - VERTICAL TAIL PLANFORM CHARACTERISTICS.

TAIL NO.	AREA $(ft)^2$	ASPECT RATIO	SPAN (ft)	TAPER RATIO	LEADING EDGE SWEEP (deg)	TRAILING EDGE SWEEP (deg)	QUARTER CHORD SWEEP (deg)	ROOT CHORD (ft)	TIP CHORD (ft)
101	200	5	10	6	45	0	36 87	25	15
102	200	.5	10	.69	45	15	39 23	23 67	16 33
103	200	.5	10	808	45	30	41 79	22 12	17 88
104	200	5	10	748	30	0	23.42	27.88	17 12
105	200	5	10	856	30	15	26 55	21 55	18.45
106	200	.5	10	1 0	30	30	30	20	20
107	200	.5	10	874	15	0	11 35	21 34	18 66
108	200	5	10	1 0	15	15	15	20 0	20 0
109	200	.5	10	1 0	0	0	0	20 0	20 0
110	200	1 0	14 14	333	45	0	36 86	21.22	7 07
111	200	1.0	14 14	464	45	15	39 25	19 32	8 96
112	200	1 0	14 14	651	45	30	41 81	17 13	11 15
113	200	1.0	14 14	552	30	0	23.41	18.22	10.06
114	200	1 0	14 14	.732	30	15	26.56	16.33	11 95
115	200	1 0	14 14	1 0	30	30	30	14 14	14 14
116	200	1.0	14 14	764	15	0	11 37	16 03	12 25
117	200	1 0	14.14	1 0	15	15	15	14 14	14 14
118	200	1 0	14 14	1.0	0	0	0	14 14	14 14
119	200	2 0	20	0	45	0	36 87	20.0	0
120	200	2.0	20	154	45	15	39 24	17.33	2 67
121	200	2 0	20	406	45	30	41 81	14 22	5 78
122	200	2 0	20	268	30	0	23.41	15 77	4 23
123	200	2 0	20	528	30	15	26.57	13 09	6 91
124	200	2.0	20	1.0	30	30	30	10	10
125	200	2.0	20	.577	15	0	11 36	12.68	7 32
126	200	2.0	20	1.0	15	15	15	10	10
127	200	2.0	20	1.0	0	0	0	10	10

TABLE 2 - CONT.

TAIL NO.	AREA $(ft)^2$	ASPECT RATIO	SPAN (ft)	TAPER RATIO	LEADING EDGE SWEEP (deg)	TRAILING EDGE SWEEP (deg)	QUARTER CHORD SWEEP (deg)	ROOT CHORD (ft)	TIP CHORD (ft)
128	100	1	10	1 0	0	0	0	10	10
129	300	1	17 52	1 0	0	0	0	17.32	17 32
130	500	1	22.36	1.0	0	0	0	22.36	22 36
3	241.2	.98	15.42	.469	45	15	39.24	21 30	9 99
132	200	2 0	20.0	154	45	15	39 24	17 33	2 67
133	300	1.0	17 32	464	45	15	39.25	23.66	10 98
134	300	2.0	24 49	.155	45	15	39 25	21.21	3 29
135	400	1 0	20 0	.463	45	15	39 23	27 34	12 66
136	400	2.0	28 28	154	45	15	39 24	24 51	3.77
137	500	1 0	22 36	464	45	15	39 24	30.55	14 17
138	500	2 0	31 62	.154	45	15	39 24	27 40	4 22
139	600	1.0	24.49	.463	45	15	39 23	33.49	15 50
140	600	2.0	34.64	.154	45	15	39 24	30 02	4 62
141	200	1.5	17.32	291	45	15	39.25	17 89	5 21

Notes.

1. Positive directions of force coefficients moment coefficients, and angles are indicated by arrows.

2. For clarity, origins of wind and stability axes have been displaced from the center of gravity.

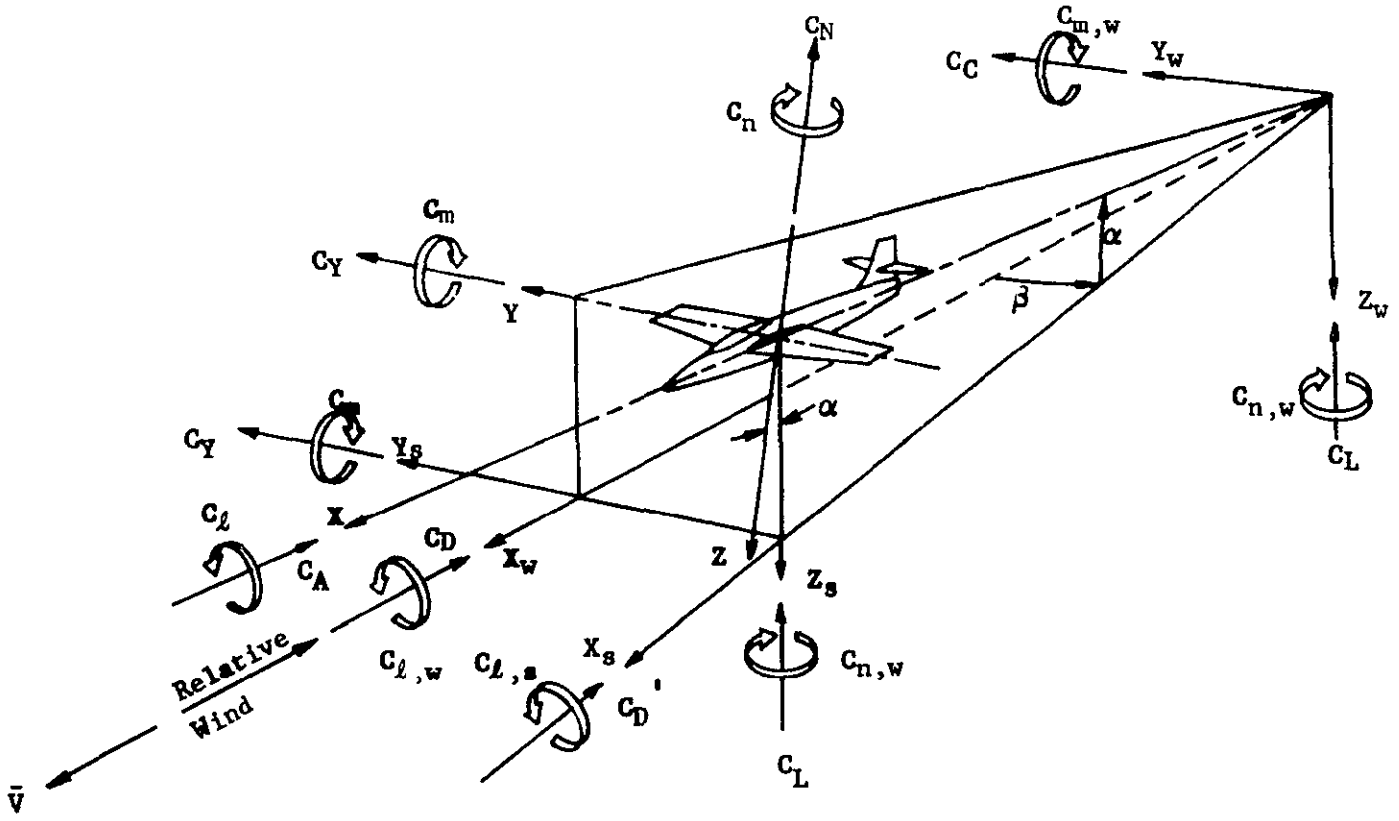


Figure 3. Axis systems, showing direction and sense of force and moment coefficients, angle of attack, and sideslip angle

NOMENCLATURE

SYMBOL	SADSAC SYMBOL	DEFINITION
A_b		base area; m^2, ft^2, in^2
a		speed of sound, m/sec, ft/sec
AR	ASPECT	aspect ratio, b^2/S
b	REFB	wing span or reference span; m, ft, in
c		wing chord, m, ft, in
$\bar{c}$		wing mean aerodynamic chord or reference chord; m, ft, in (see ℓ_{ref} or refl)
c.g.		center of gravity
C.P.		center of pressure
C_A	CA	axial force coefficient, F_A/qS_{ref}
C_{A_b}	CAB	base axial force coefficient, $[(p_\infty - p_b/q](A_b/S_{ref})$
C_{A_f}	CAF	forebody axial force coefficient, $C_A - C_{A_b}$
C_D	CDTOTL	drag force coefficient in the wind axis system, $F_D/q\,S_{ref}$

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
C'_D	CD	drag force coefficient in the stability axis system, $F'_D/q\,S_{ref}$
C_L	CL	lift force coefficient (stability or wind axis) $F_L/q\,S_{ref}$
C_ℓ	CBL	rolling moment coefficient in body axis system, $M_x/q\,S_{ref}\,b$
$C_{\ell,s}$	CSL	rolling moment coefficient in the stability axis system, $M_{x,s}/q\,S_{ref}\,b$
$C_{\ell,w}$	CWL	rolling moment coefficient in the wind axis system, $M_{x,w}/q\,S_{ref}\,b$
C_m	CLM	pitching moment coefficient in the body axis system, $M_y/q\,S_{ref}\,\ell_{ref}$
$C_{m,s}$	CLM	pitching moment coefficient in the stability axis system, $C_{m,s} = C_m$
$C_{m,w}$	CPM	pitching moment coefficient in the wind axis system, $M_{y,w}/q\,S_{ref}\,\ell_{ref}$
C_N	CN	normal force coefficient in the body axis system, $F_N/q\,S_{ref}$

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
C_n	CYN	yawing moment coefficient in the body axis system, $M_z/q\,S_{ref}\,b$
$C_{n,s}$	CLN	yawing moment coefficient in the stability axis system, $C_{n,s} = C_n$
$C_{n,w}$	CLN	yawing moment coefficient in the wind axis system, $M_{z,w}/q\,S_{ref}\,b$
C_p	CP	pressure coefficient, $(p-p_\infty)/q$
C_y	CY	side force coefficient (body or stability axis system), $F_y/q\,S_{ref}$
C_c	CC	side force coefficient (wind axis system), $F_y/q\,S_{ref}$
F_A		axial force, N, lb
F_D		drag force in wind axis system; N, lb
F'_D		drag force in the stability axis system; N, lb
F_L		lift force (stability or wind axis system); N, lb
F_N		normal force; N, lb

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
F_Y		side force; N, lb
	N/A	normal to axial force ratio
ℓ_{ref}	REFL	reference length; m, ft, in (see $\bar{c}$)
L/D	L/D	lift-to-drag ratio, C_L/C_D (stability axis system)
L/D	CL/CD	lift-to-drag ratio, C_L/C_D (wind axis system)
M	MACH	Mach number
MRP	MRP	abbreviation for moment reference point
	XMRP	abbreviation for moment reference point on x-axis
	YMRP	abbreviation for moment reference point on y-axis
	ZMRP	abbreviation for moment reference point on z-axis
M_x		rolling moment in the body axis system, N-m, ft-lb
$M_{x,s}$		rolling moment in the stability axis system; N-m, ft-lb

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
$M_{x,w}$		rolling moment in the wind axis system; N-m, ft-lb
M_y		pitching moment in the body (or stability) axis system; N-m, ft-lb
$M_{y,w}$		pitching moment in the wind axis system; N-m, ft-lb
M_z		yawing moment in the body axis system; N-m, ft-lb
$M_{z,w}$		yawing moment in the wind axis system; N-m, ft-lb
p		static pressure; N/m^2; psi
P		total pressure; N/m^2; psi
q	Q(PSI) Q(PSF)	dynamic pressure; N/m^2, psi, psf
RN/L	RN/L	Reynold's number per unit length; million/ft.
S		wing area; m^2, ft^2
S_{ref}	REFS	reference area; m^2, ft^2
T		temperature; °K, °C, °R, °F
V		speed of vehicle relative to surrounding atmosphere; m/sec, ft/sec

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
^{1}T		tail incidence positive when trailing edge down, deg
$\overline{V}$		velocity of vehicle relative to surrounding atmosphere; m/sec, ft/sec
α	ALPHA	angle of attack, angle between the projection of the wind X_W-axis on the body X, Z-plane and the body X-axis, deg
β	BETA	sideslip angle, angle between the wind X_W-axis and the projection of this axis on the body X-Z-plane; deg
γ		ratio of specific heats
Γ	DIHDRL	wing dihedral angle; deg
δ		control surface deflection angle; deg positive deflections are:
	AILRON	aileron - left aileron trailing edge down
	ELVATR	elevator - trailing edge down
	RUDDER	rudder - trailing edge to the left
	FLAP	flap - trailing edge down
	TAB	tab - trailing edge down with respect to control surface
ρ		air density; K_g/m^3, slugs/ft^3

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINATION
LSWEEP		leading edge sweep of the vertical tail, degrees
TSWEEP		trailing edge sweep of the vertical tail, degrees
AREA		parameter name for vertical tail planform area (see table 2)

NOMENCLATURE (continued)

SYMBOL	SADSAC SYMBOL	DEFINITION
θ		pitch angle, angle of rotation about the body Y-axis, positive when the positive Z-axis is rotated toward the positive X-axis, deg
ϕ	PHI	roll angle, angle of rotation about the body X-axis, positive when the positive Y-axis is rotated toward the positive Z-axis, deg
ψ	PSI	yaw angle, angle of rotation about the body Z-axis, positive when the positive X-axis is rotated toward the positive Y-axis; deg

NOMENCLATURE (continued)

SUBSCRIPTS	DEFINITION
a	aileron
b	base
c	canard
e	elevator or elevon
f	flap
r	rudder or ruddervator
s	stability axis system
t	tail, or total conditions
w	wind axis system
ref	reference conditions

TABULATED DATA LISTING

A tabulated data listing, consisting of all aero data sets, both original and those created in arriving at the plotted material to be presented subsequently, is available as an addendum to this report. The tabular listing is made up in three sections:

(a) a brief summary list of all data sets containing the identifier, the descriptor, and the resident dependent variables.

(b) an expanded list of all data sets, containing the identifier, the descriptor, the resident dependent variables, reference data, parameters and respective values, and independent variable ranges.

(c) the full list of all data sets containing all resident or selected aerodynamic coefficients of the data sets as well as the above mentioned information.

The listing is currently sent on limited distribution to the following organizations.

NASA AMES	Mr. John Axelson
NASA LaRC	Mr. David Stone
NASA MSC	Mr. Ray Nelson
NASA MSFC	Mr Jim Weaver

If copies of this listing are desired, please contact the above or the cognizant SADSAC personnel who, for this data, is

W. R. Morgan
Department 2780
Chrysler Corporation Space Division
New Orleans, La. 70129

(504) 255-2214
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DATA PLOT INDEX

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF SIDESLIP

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7002 RG7003

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	ALPHA	1	1
CYN	ALPHA	2	2
CBL	ALPHA	3	3

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7009 RG7008 RG7007 RG7006 RG7005 RG7004

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	PLOT PAGE ENDING
CY	BETA	4	4
CYN	BETA	5	5
CBL	BETA	6	6

DATASETS PLOTTED:
RG7010 RG7011 RG7012 RG7013 RG7014 RG7015

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	PLOT PAGE ENDING
CY	BETA	7	7
CYN	BETA	8	8
CBL	BETA	9	9

DATASETS PLOTTED:
RG7017 RG7016

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	PLOT PAGE ENDING
CY	BETA	10	10
CYN	BETA	11	11
CBL	BETA	12	12

DATASETS PLOTTED:
RG7018 RG7019

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	PLOT PAGE ENDING
CY	BETA	13	13
CYN	BETA	14	14
CBL	BETA	15	15

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7011 RG7054 RG7056 RG7058 RG7060

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	16	16
CYN	BETA	17	17
CBL	BETA	18	18

DATASETS PLOTTED:
RG7018 RG7055 RG7057 RG7059 RG7061

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	19	19
CYN	BETA	20	20
CBL	BETA	21	21

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7017 RG7011 RG7063 RG7053

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	22	22
CYN	BETA	23	23
CBL	BETA	24	24

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF LEADING EDGE SWEEP

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7043 RG7041 RG7038 RG7036

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	25	25
CYN	BETA	26	26
CBL	BETA	27	27

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7020 RG7017 RG7021

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	28	28
CYN	BETA	29	29
CBL	BETA	30	30

DATASETS PLOTTED:
RG7022 RG7023 RG7024

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	31	31
CYN	BETA	32	32
CBL	BETA	33	33

DATASETS PLOTTED:
RG7025 RG7026

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	34	34
CYN	BETA	35	35
CBL	BETA	36	36

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC 5-5 ORB, ASPECT RATIO EFFECT

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7027 RG7035 RG7043

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	37	37
CYN	BETA	38	38
CBL	BETA	39	39

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7028 RG7011 RG7029

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	40	40
CYN	BETA	41	41
CBL	BETA	42	42

DATASETS PLOTTED:
RG7030 RG7031 RG7032

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	43	43
CYN	BETA	44	44
CBL	BETA	45	45

DATASETS PLOTTED:
RG7033 RG7034

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	46	46
CYN	BETA	47	47
CBL	BETA	48	48

DATASETS PLOTTED:
RG7036 RG7018 RG7037

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	49	49
CYN	BETA	50	50
CBL	BETA	51	51

DATASETS PLOTTED:
RG7038 RG7039 RG7040

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	52	52

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7038 RG7039 RG7040

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CYN	BETA	53	53
CBL	BETA	54	54

DATASETS PLOTTED:
RG7041 RG7042

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	55	55
CYN	BETA	56	56
CBL	BETA	57	57

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S=5 ORB, EFFECT OF AREA

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE, PARAMETRIC STUDY

DATASETS PLOTTED:
RG7044 RG7035 RG7045 RG7046

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
CY	BETA	58	58
CYN	BETA	59	59
CBL	BETA	60	60

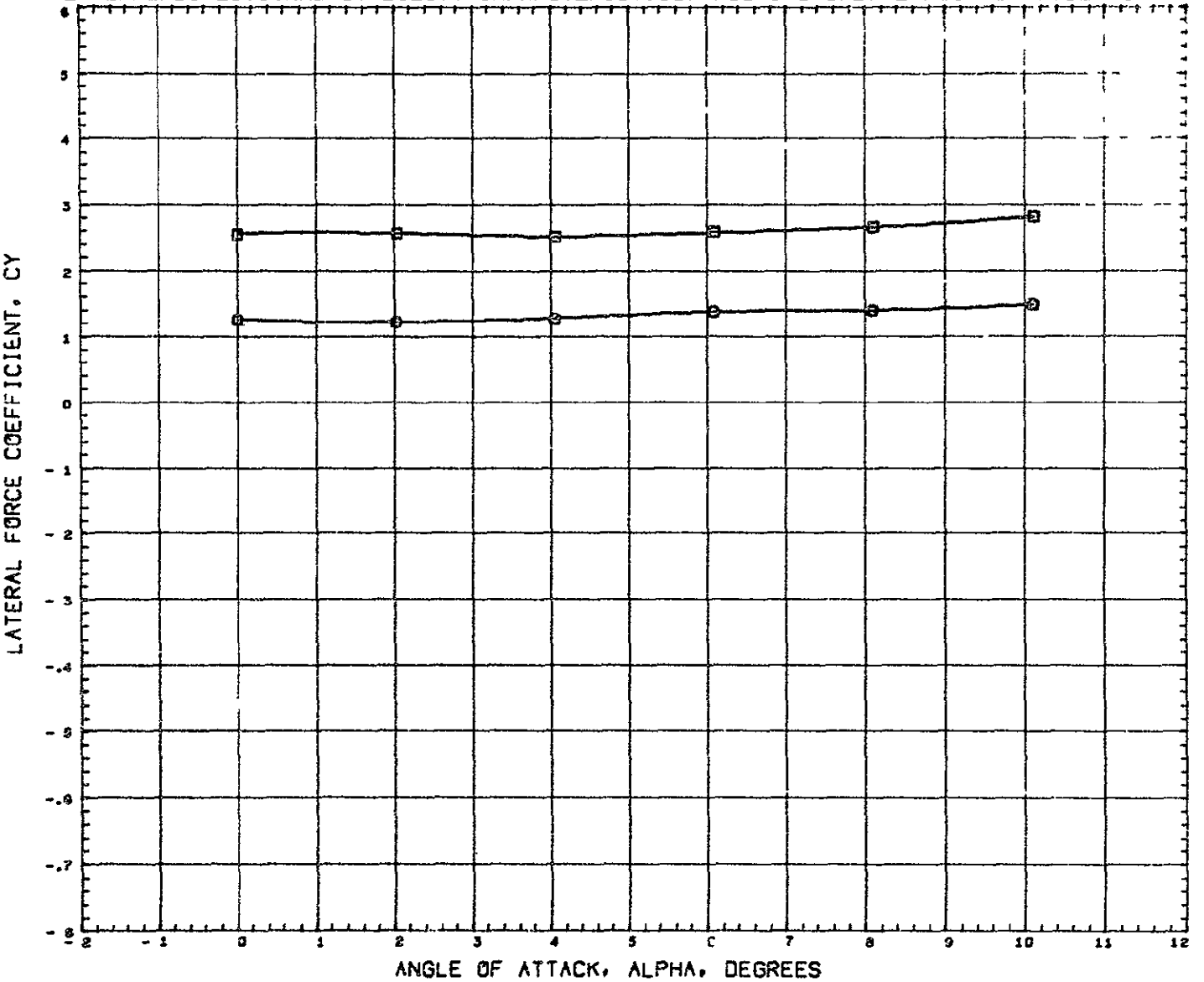
LATERAL/DIRECTIONAL STABILITY DATA, MSC S=5 ORB, COMPARISON OF V3 DATA

DEPENDENT VARIABLE VS INDEPENDENT VARIABLE,

DATASETS PLOTTED	DEPENDENT VARIABLE	INDEPENDENT VARIABLE	PLOT PAGE BEGINNING	/ ENDING
RG7048	CY	BETA	61	61
RG7048	CYN	BETA	62	62
RG7048	CBL	BETA	63	63

PLOTTED DATA

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF SIDESLIP



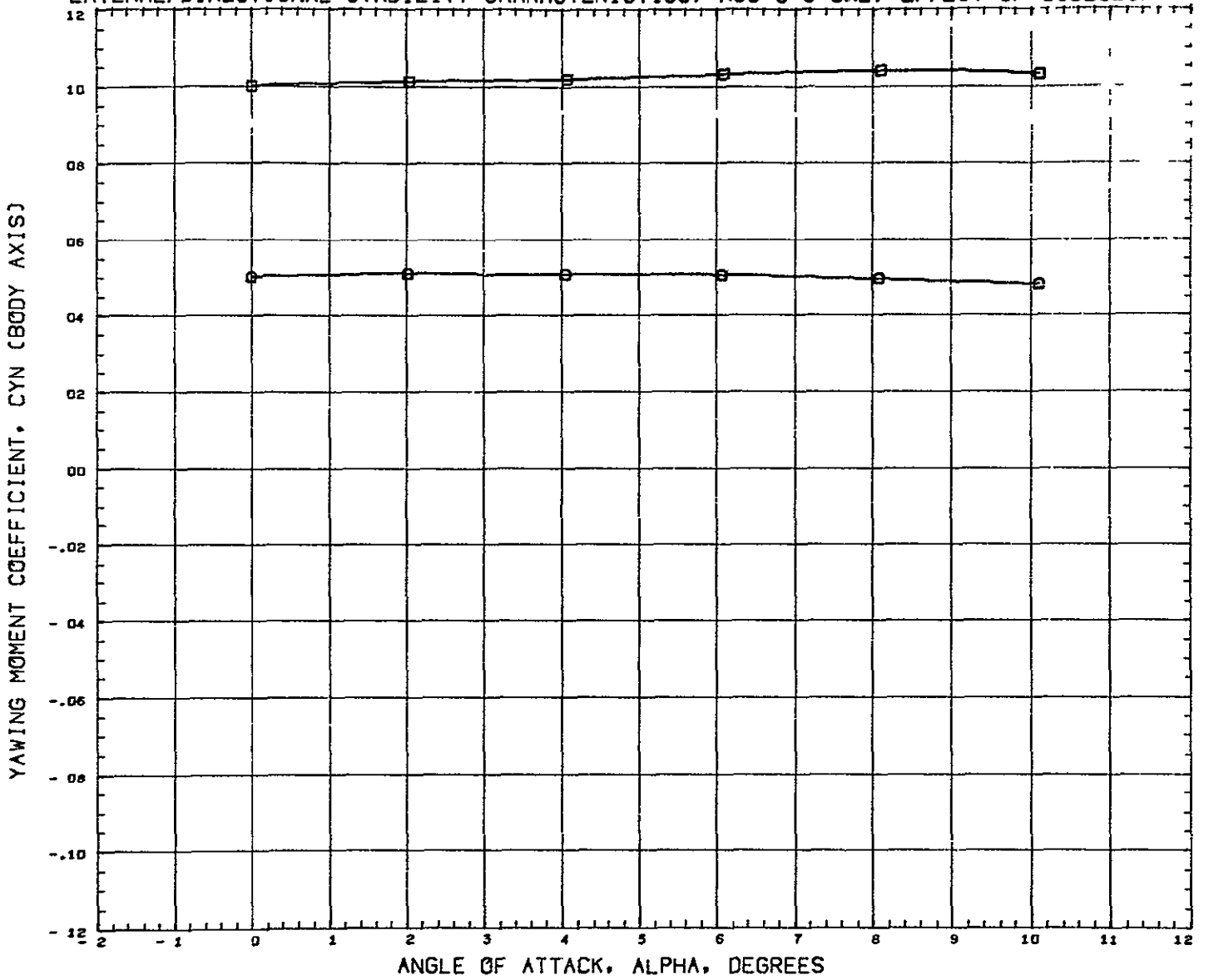
SYMBOL	BETA	PARAMETRIC VALUES
□	- 5.000	MACH 0.250
□	-10.000	

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF SIDESLIP



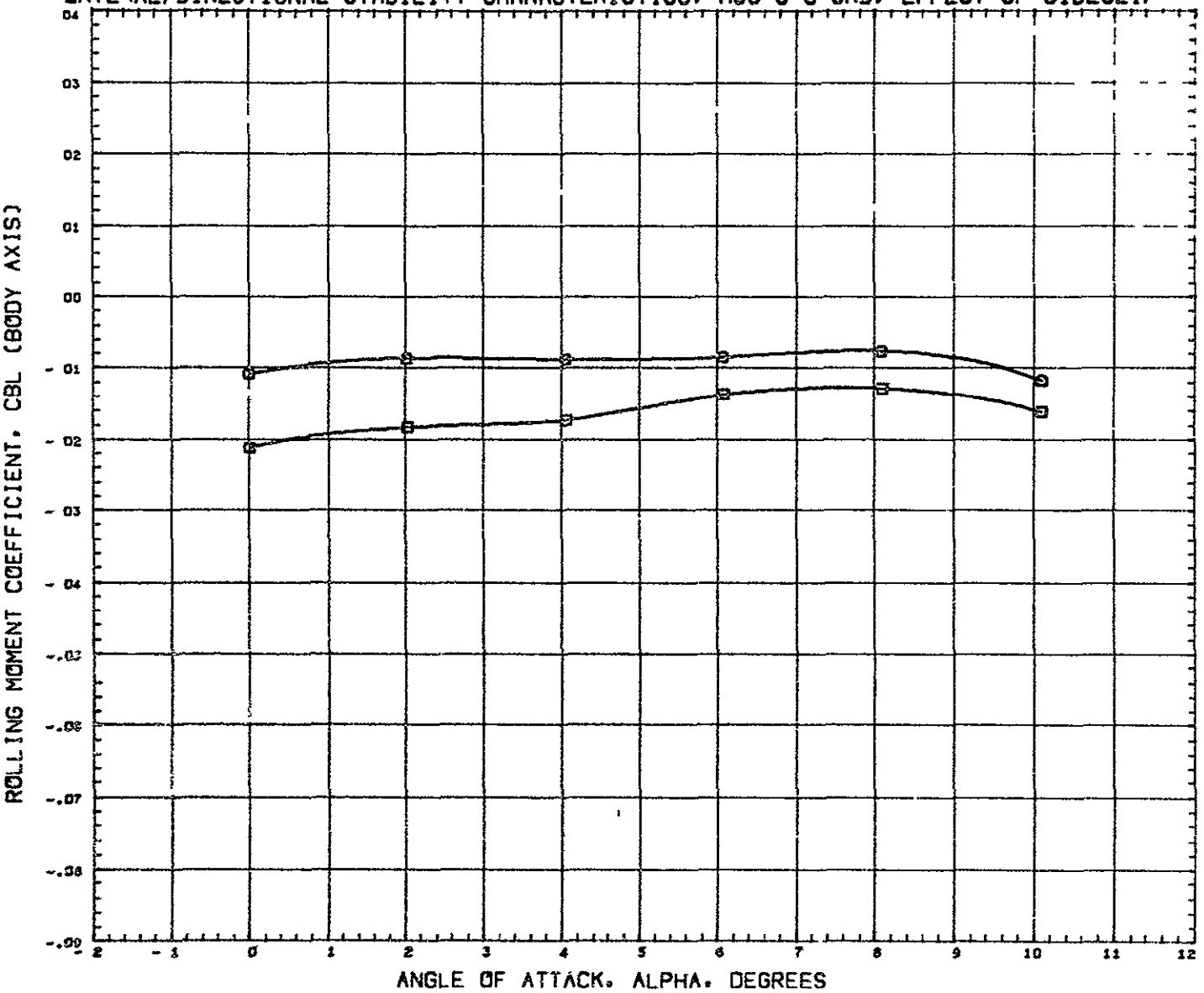
SYMBOL	BETA	PARAMETRIC VALUES	
O	- 5 000	MACH	0 250
□	- 10 000		

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF SIDESLIP



SYMBOL	BETA
O	- 5.000
□	- 10.000

PARAMETRIC VALUES

MACH 0.250

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

REFERENCE FILE

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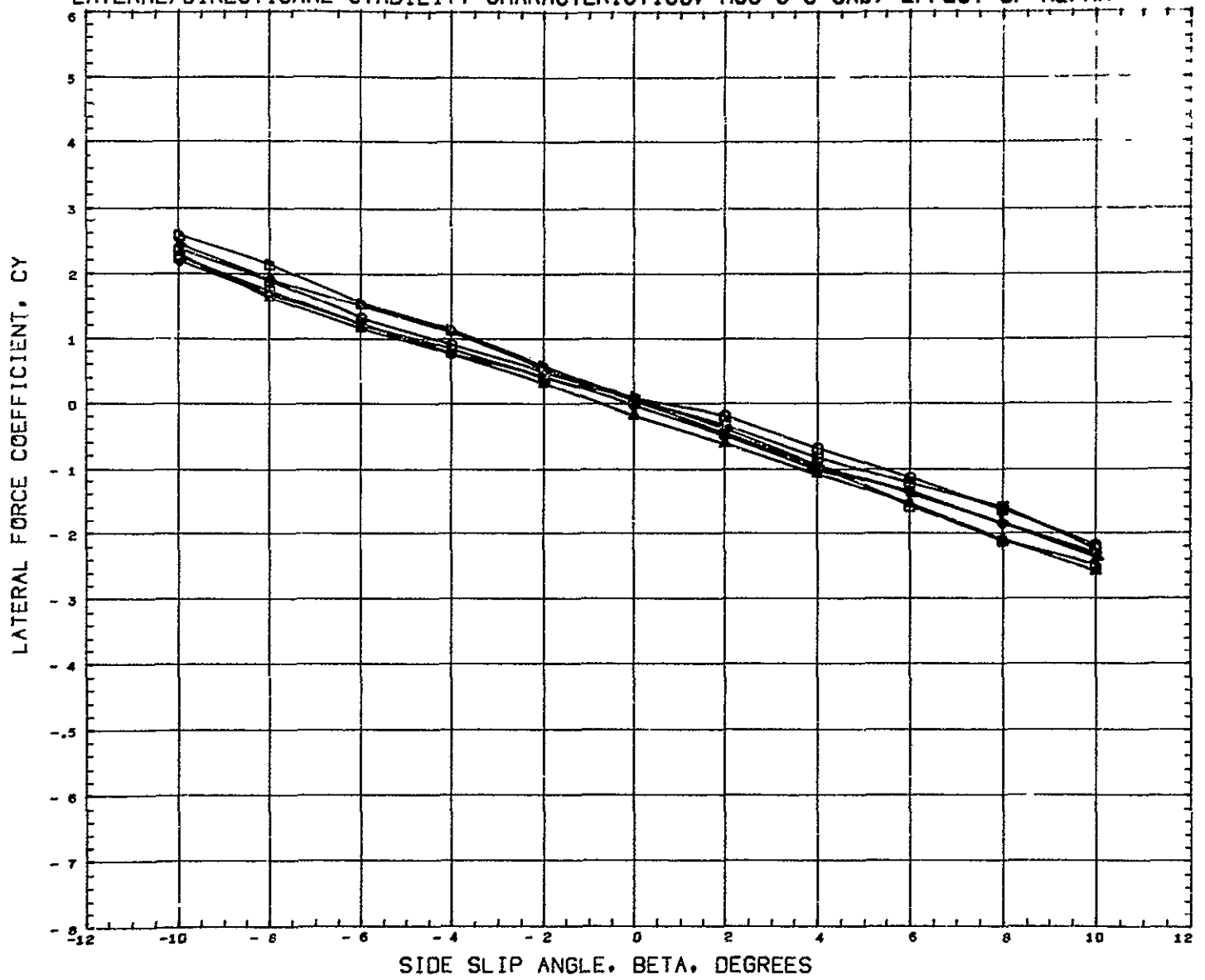
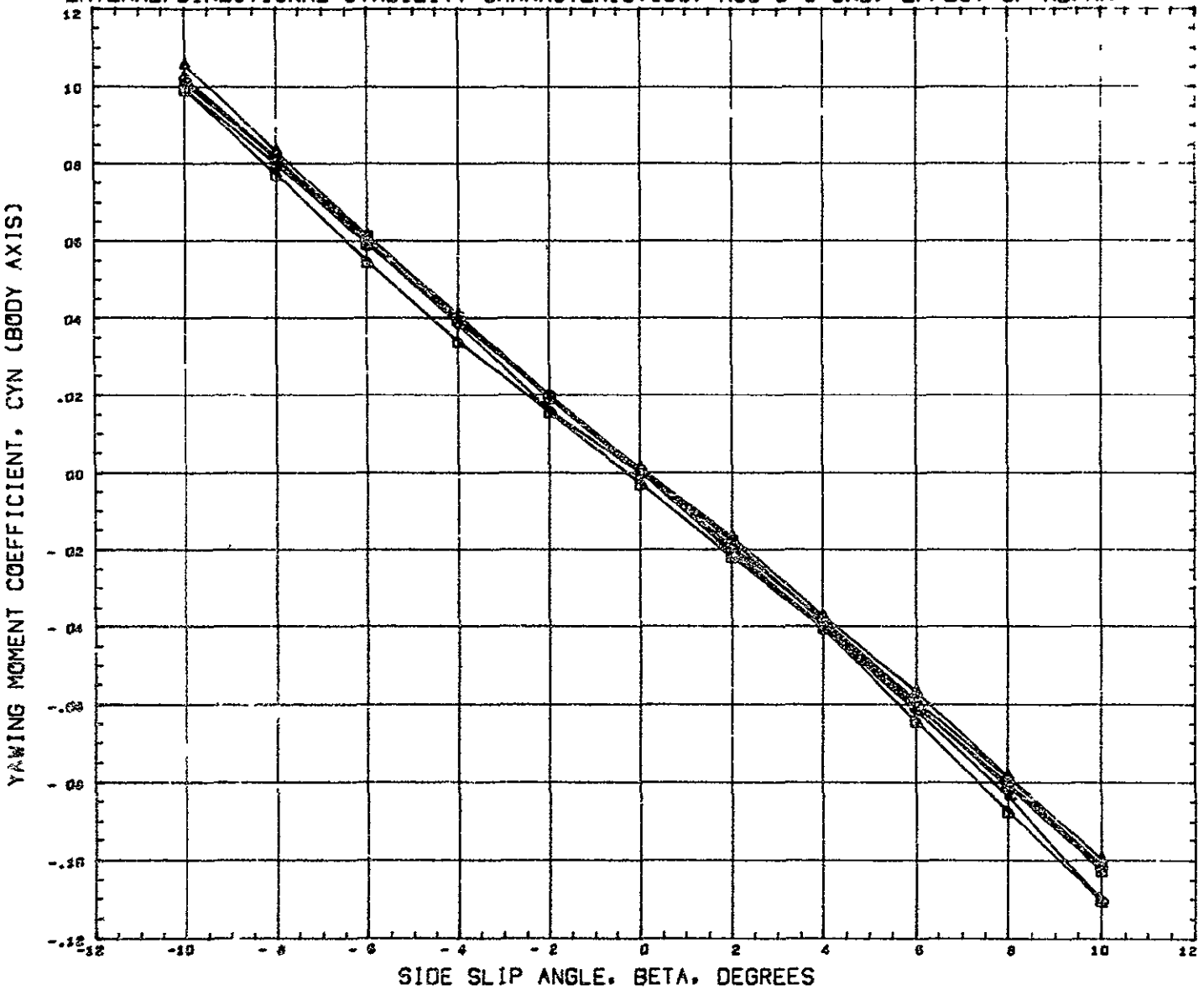
LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA		PARAMETRIC VALUES
O	0 000	MACH	0 250
□	2 000		
◇	4 000		
Δ	6 000		
▷	8 000		
D	10 000	REFERENCE FILE	

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

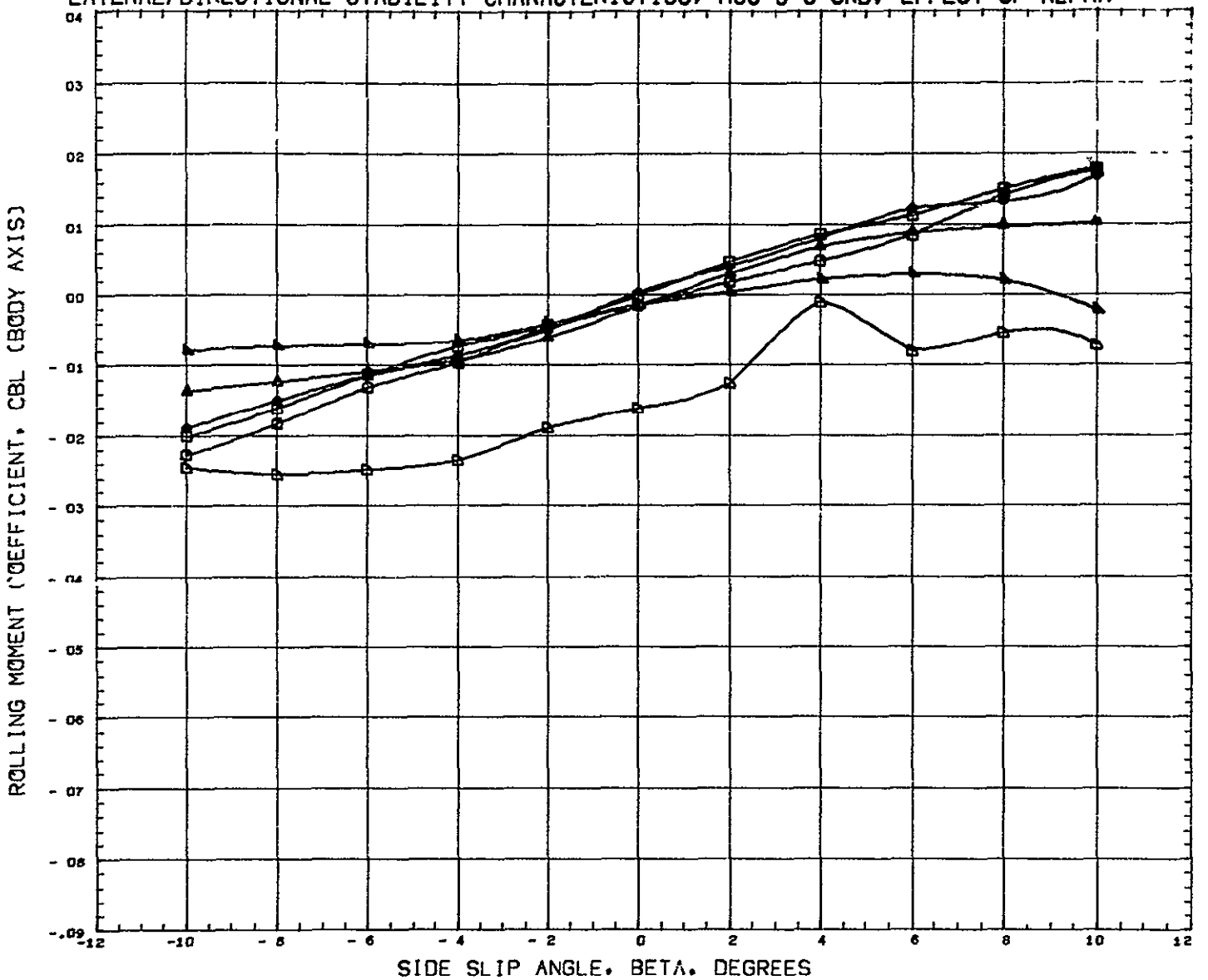
LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA	PARAMETRIC VALUES	
○	0.000	MACH	0.250
□	2.000		
◇	4.000		
△	6.000		
▷	- .200		
D	10.000	REFERENCE FILE	

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

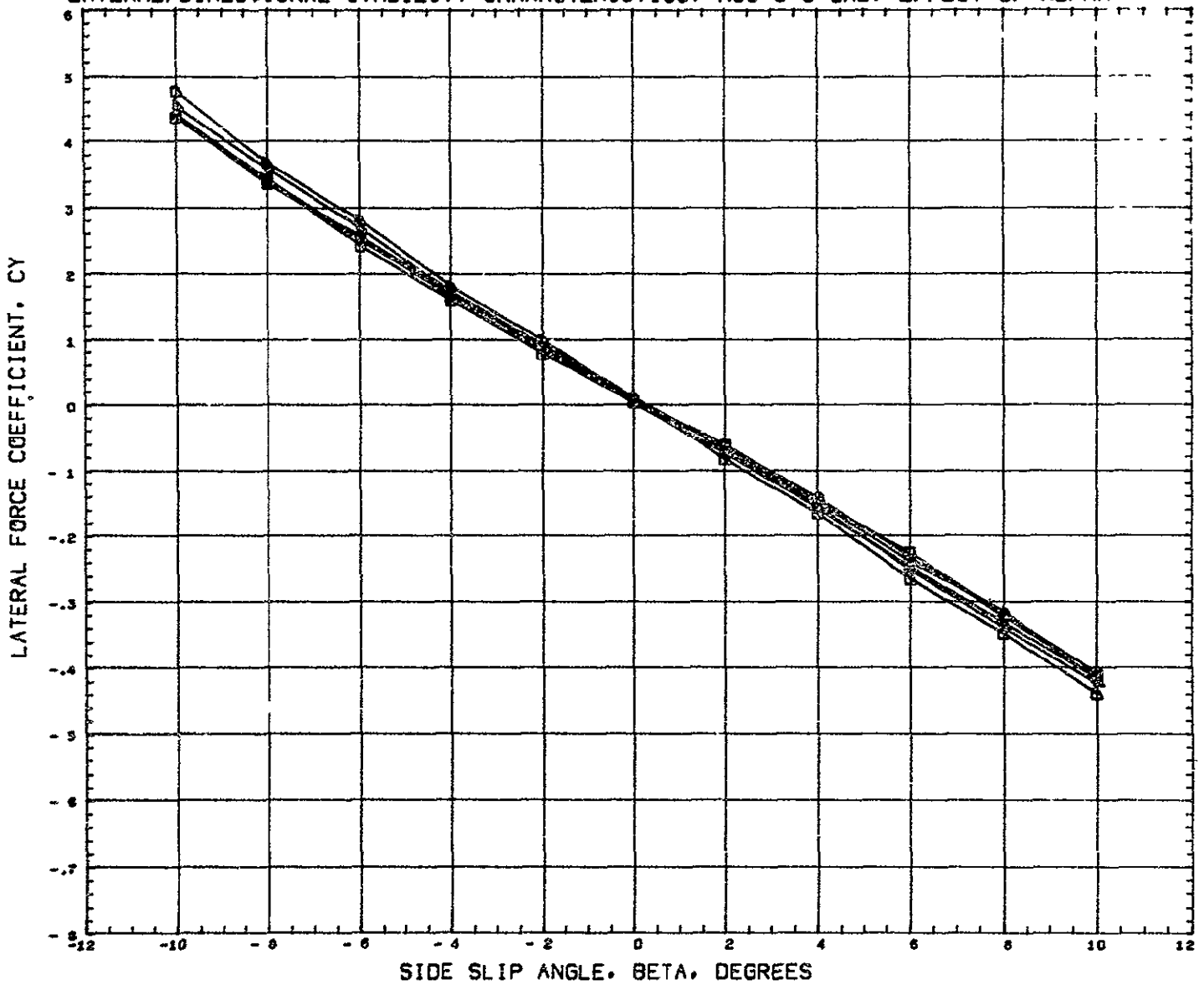
LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA		PARAMETRIC VALUES
○	0.000	MACH	0.250
□	2.000		
◇	4.000		
△	6.000		
▷	8.000		
▷	10.000	REFERENCE FILE	

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

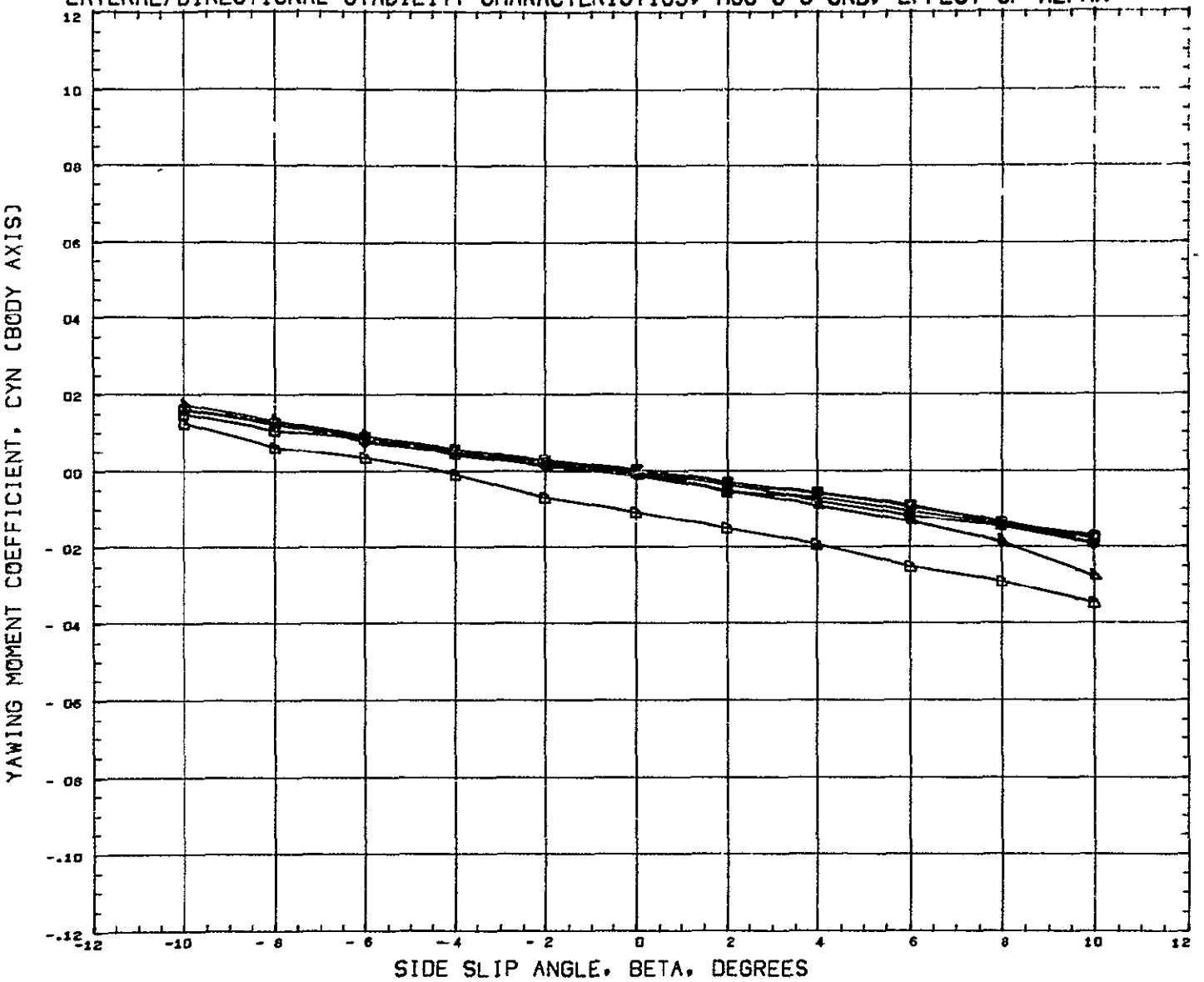
LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA		PARAMETRIC VALUES		
□	0.000	MACH	0.250	AREA	200.000
□	2.000	ASPECT	1.000	LSWEEP	45.000
◇	4.000	TSWEEP	15.000		
△	6.000				
▷	.000				
▷	10.000	REFERENCE FILE			

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
O	0 000
□	2 000
◇	4 000
△	6 000
▷	8 000
D	10 000

PARAMETRIC VALUES

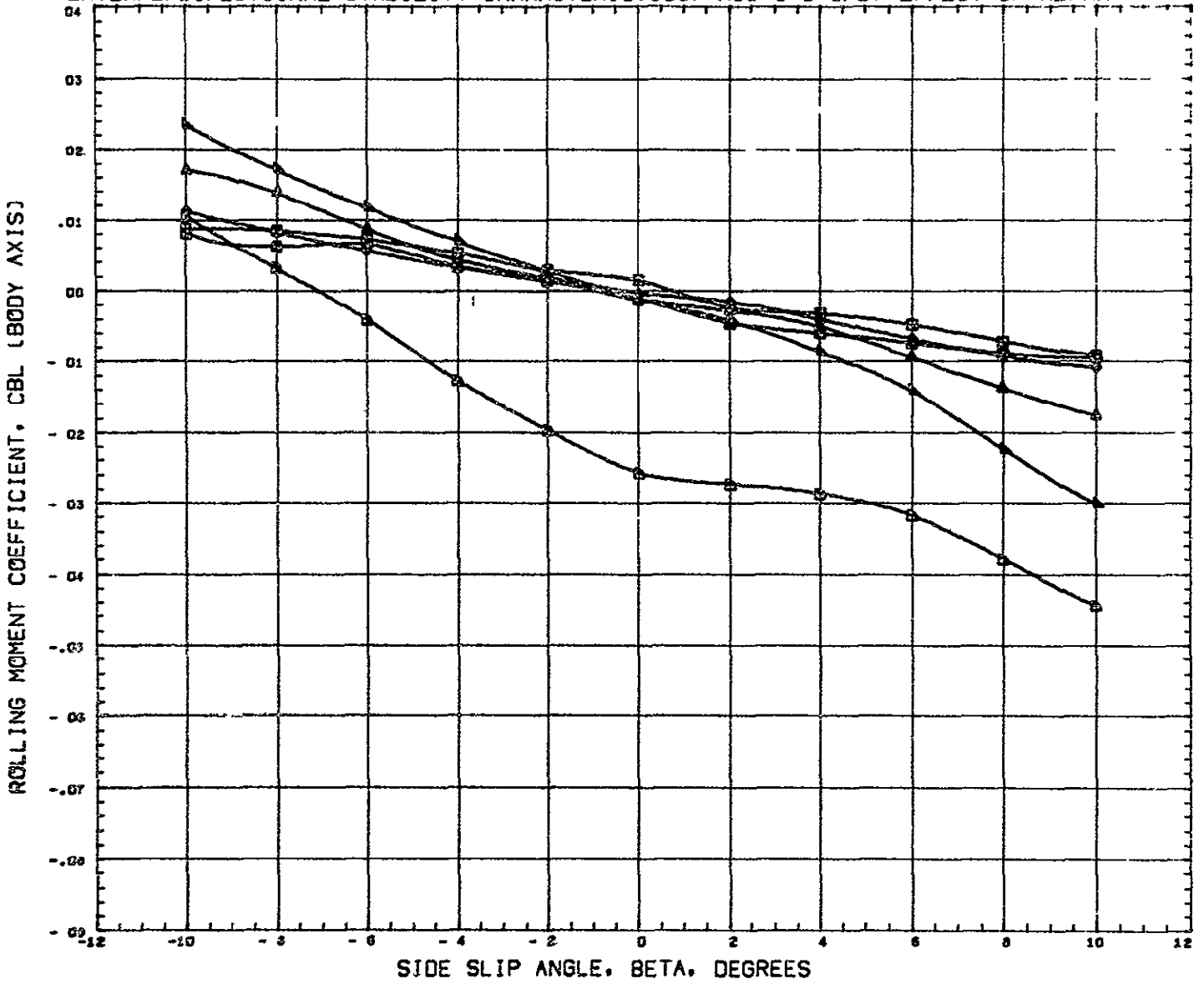
MACH	0 250	AREA	200 000
ASPECT	1 000	LSWEEP	45 000
TSWEEP	15 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

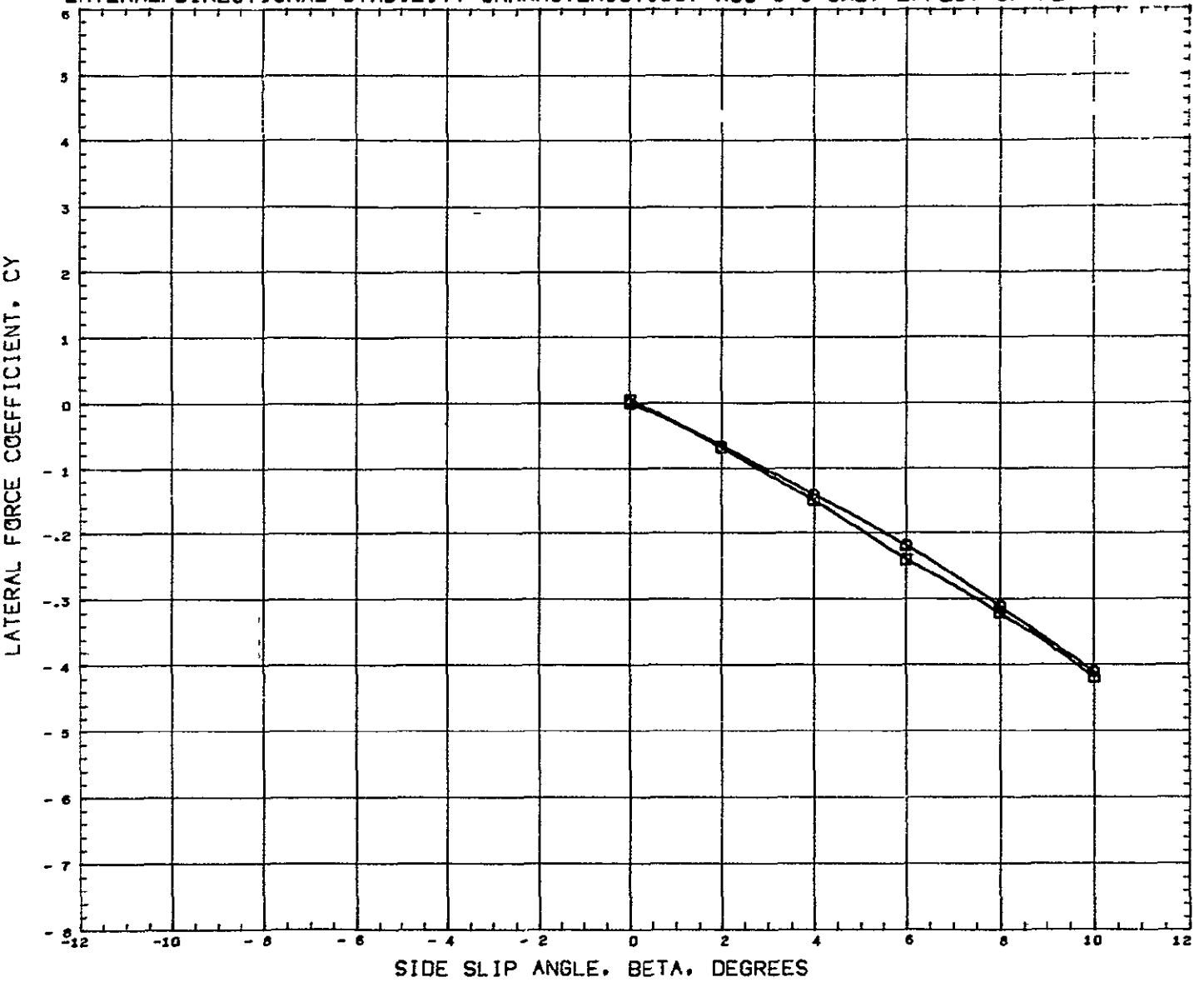
LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA		PARAMETRIC VALUES		
□	0.000	MACH	0.250	AREA	200.000
□	2.000	ASPECT	1.000	LSWEEP	45.000
◇	4.000	TSWEEP	15.000		
△	6.000				
▽	8.000				
○	10.000	REFERENCE FILE			

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
O	2 000
□	10 000

PARAMETRIC VALUES

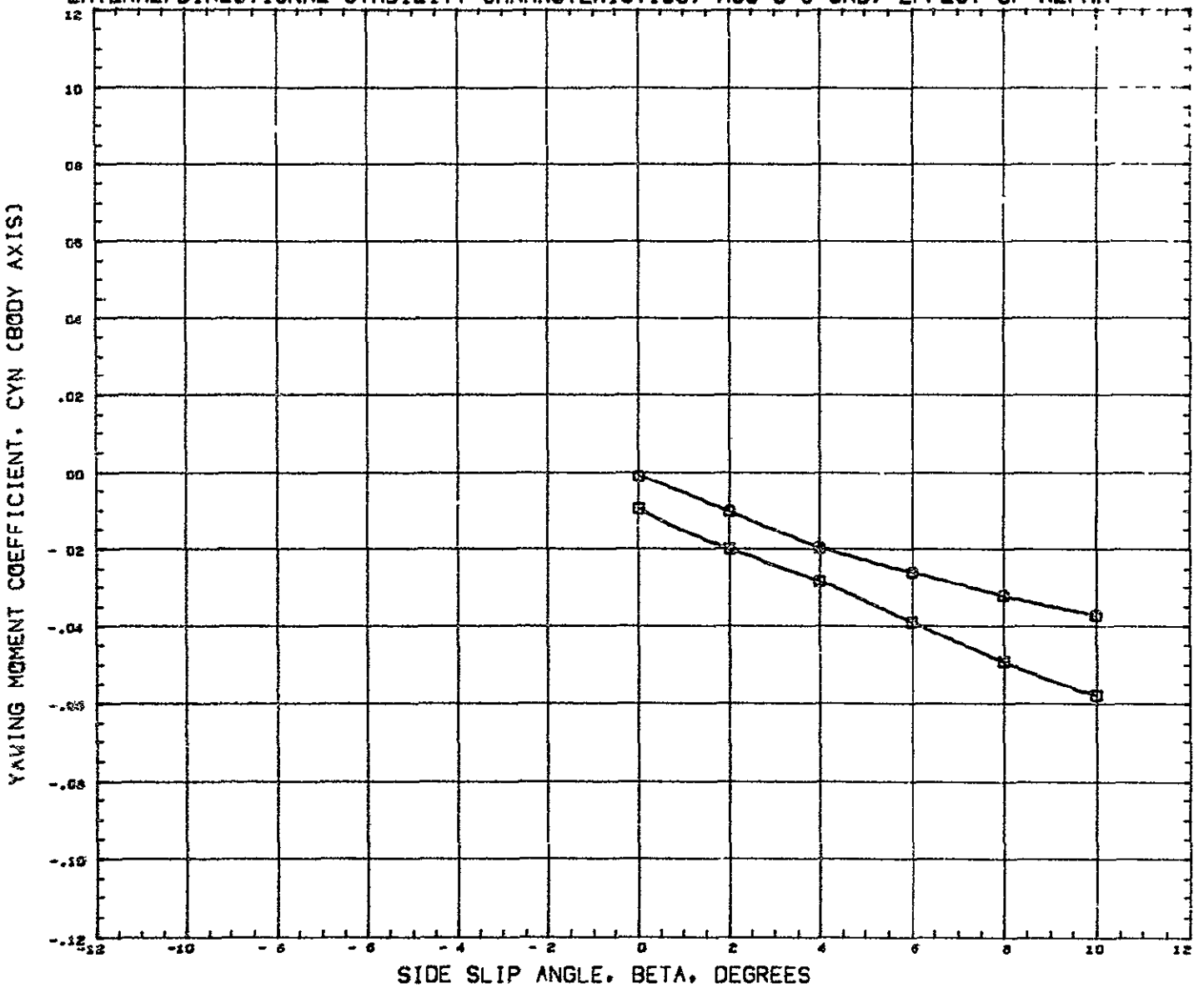
MACH	0 250	AREA	200 000
ASPECT	0 500	LSWEEP	45 000
TSWEEP	15 000		

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
□	2 000
□	10 000

PARAMETRIC VALUES

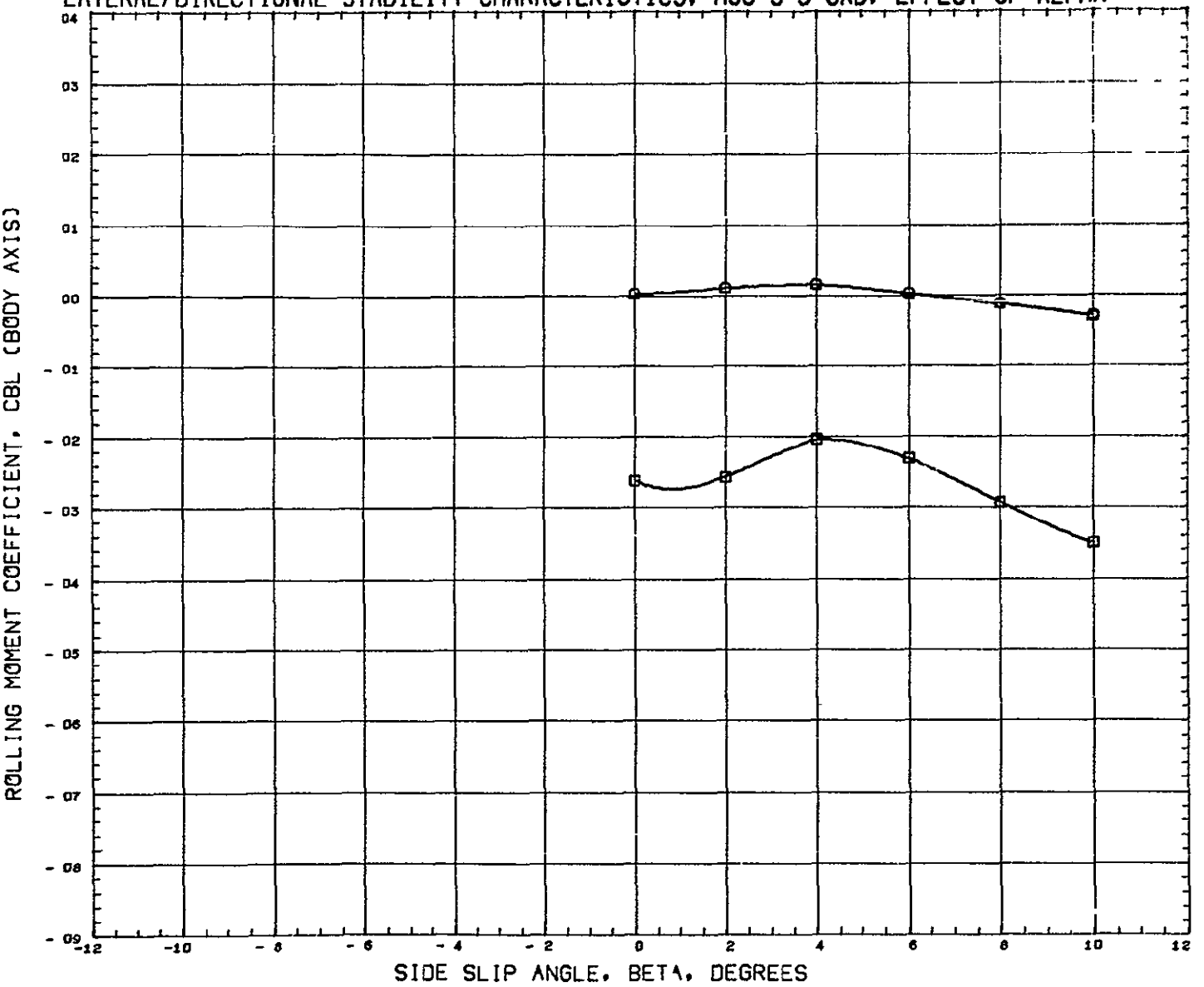
MACH	0 250	AREA	200 000
ASPECT	0 500	LSWEEP	45 000
TSWEEP	15 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0.0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
O	2.000
□	10.000

PARAMETRIC VALUES

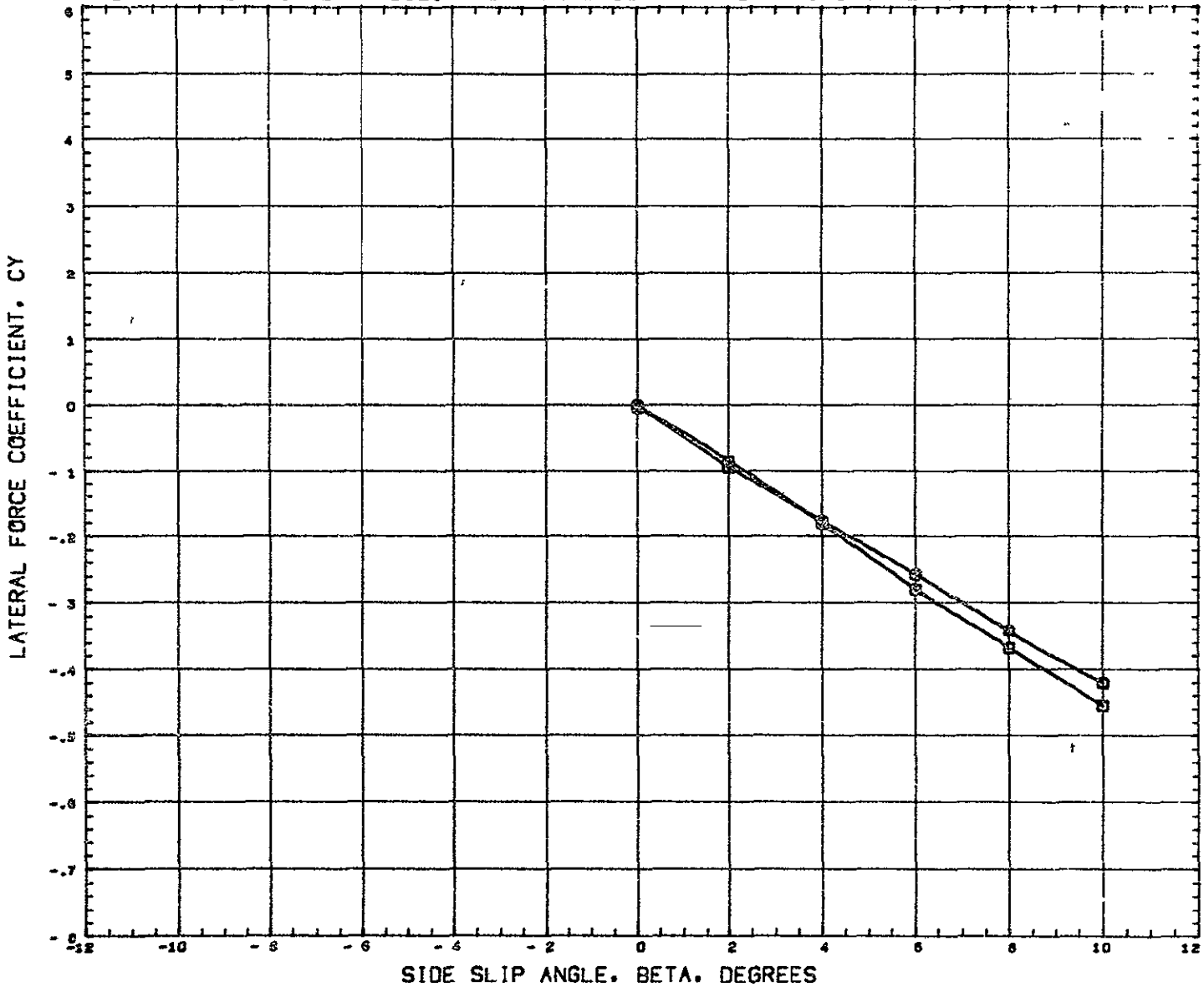
MACH	0.250	AREA	200.000
ASPECT	0.500	LSWEEP	45.000
TSWEEP	15.000		

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
□	2 000
□	10 000

PARAMETRIC VALUES

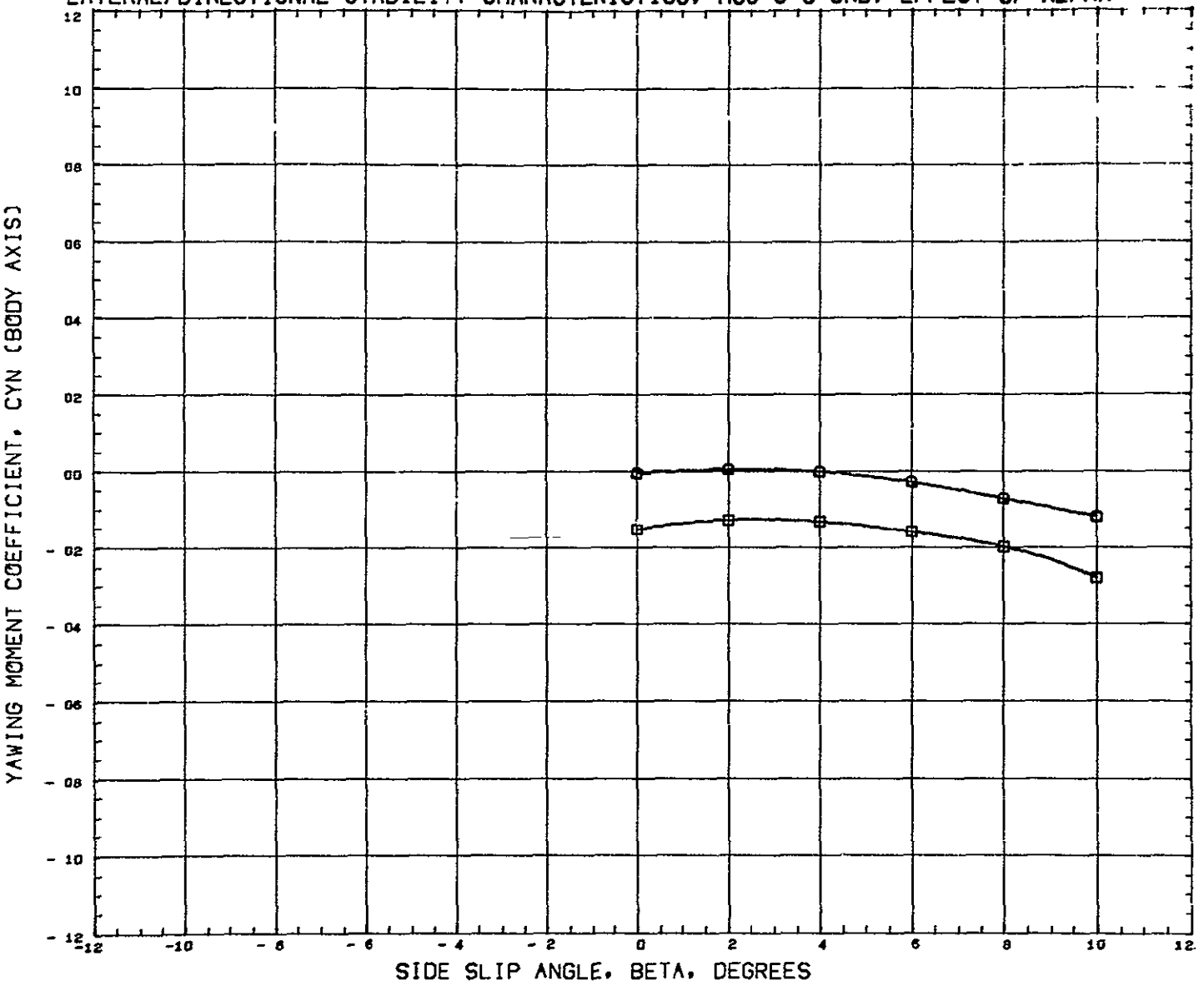
MACH	0 250	AREA	200 000
ASPECT	2 000	LSWEEP	45 000
TSWEEP	15 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
○	2 000
□	10 000

PARAMETRIC VALUES

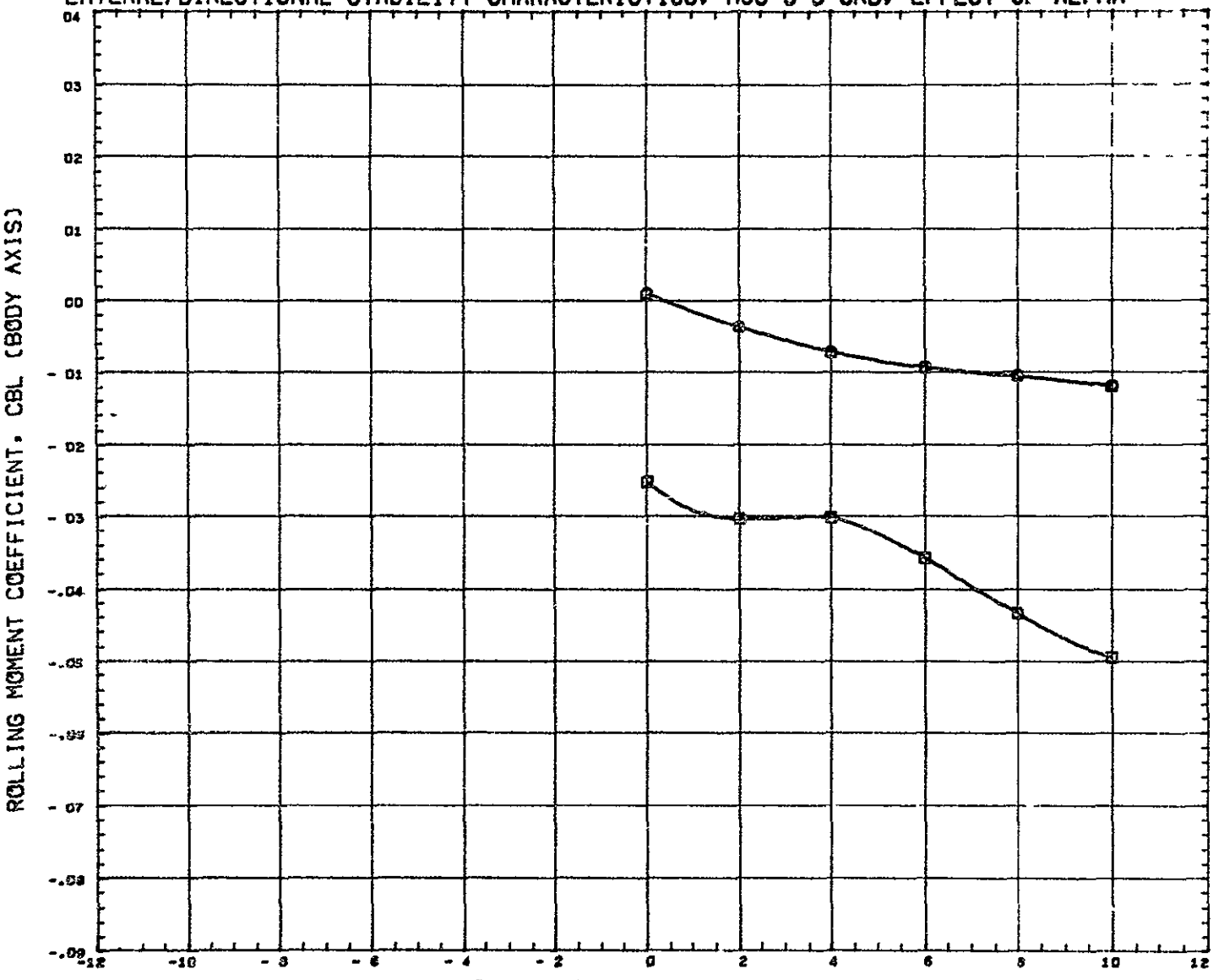
MACH	0 250	AREA	200 000
ASPECT	2 000	LSWEEP	45 000
TSWEEP	15 000		

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	4 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF ALPHA



SYMBOL	ALPHA
O	2.000
□	10.000

PARAMETRIC VALUES

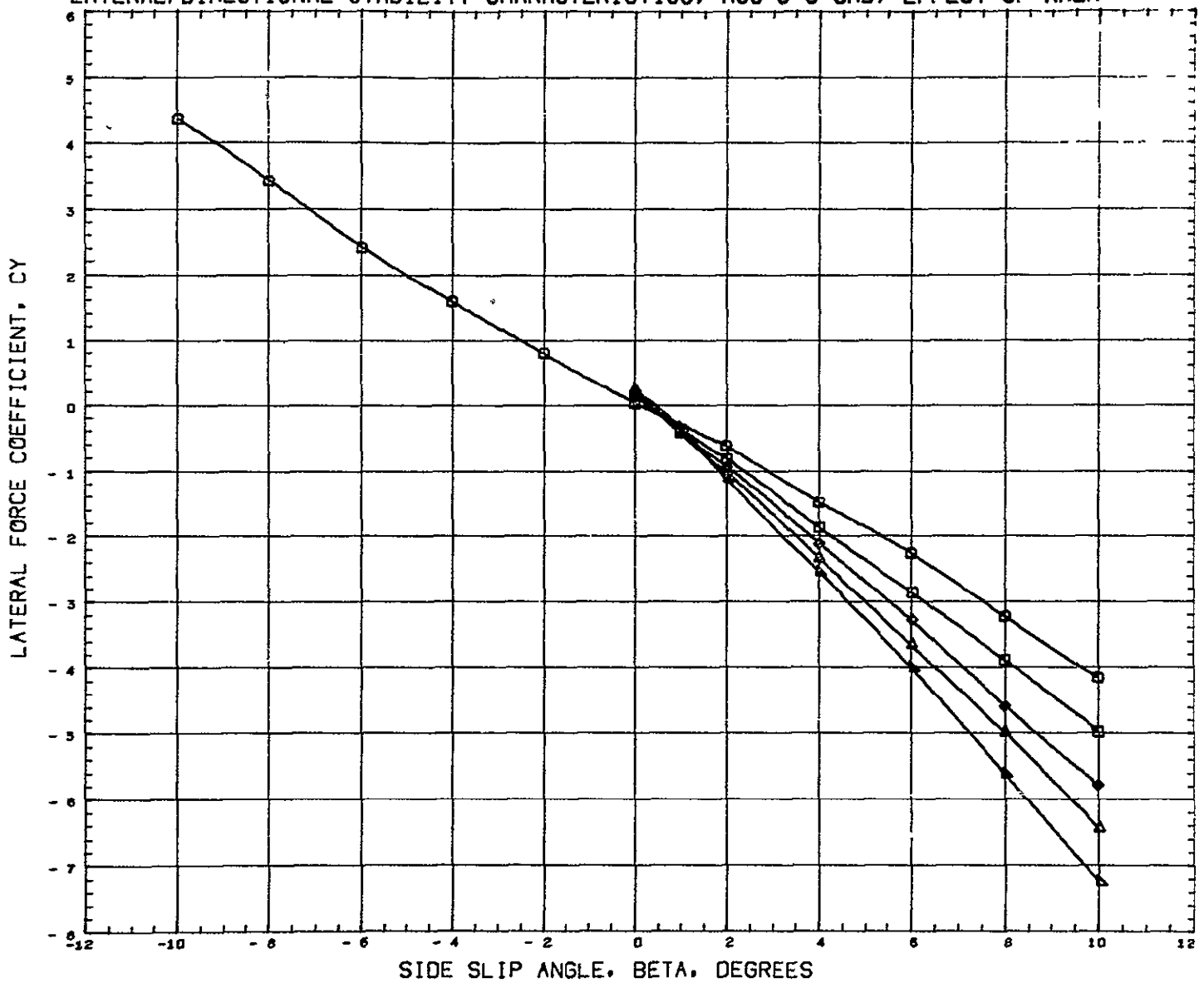
MACH	0.250	AREA	200.000
ASPECT	2.000	LSWEEP	45.000
TSWEEP	15.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	200.000
□	300.000
◇	400.000
△	500.000
▷	[illegible] 000

PARAMETRIC VALUES

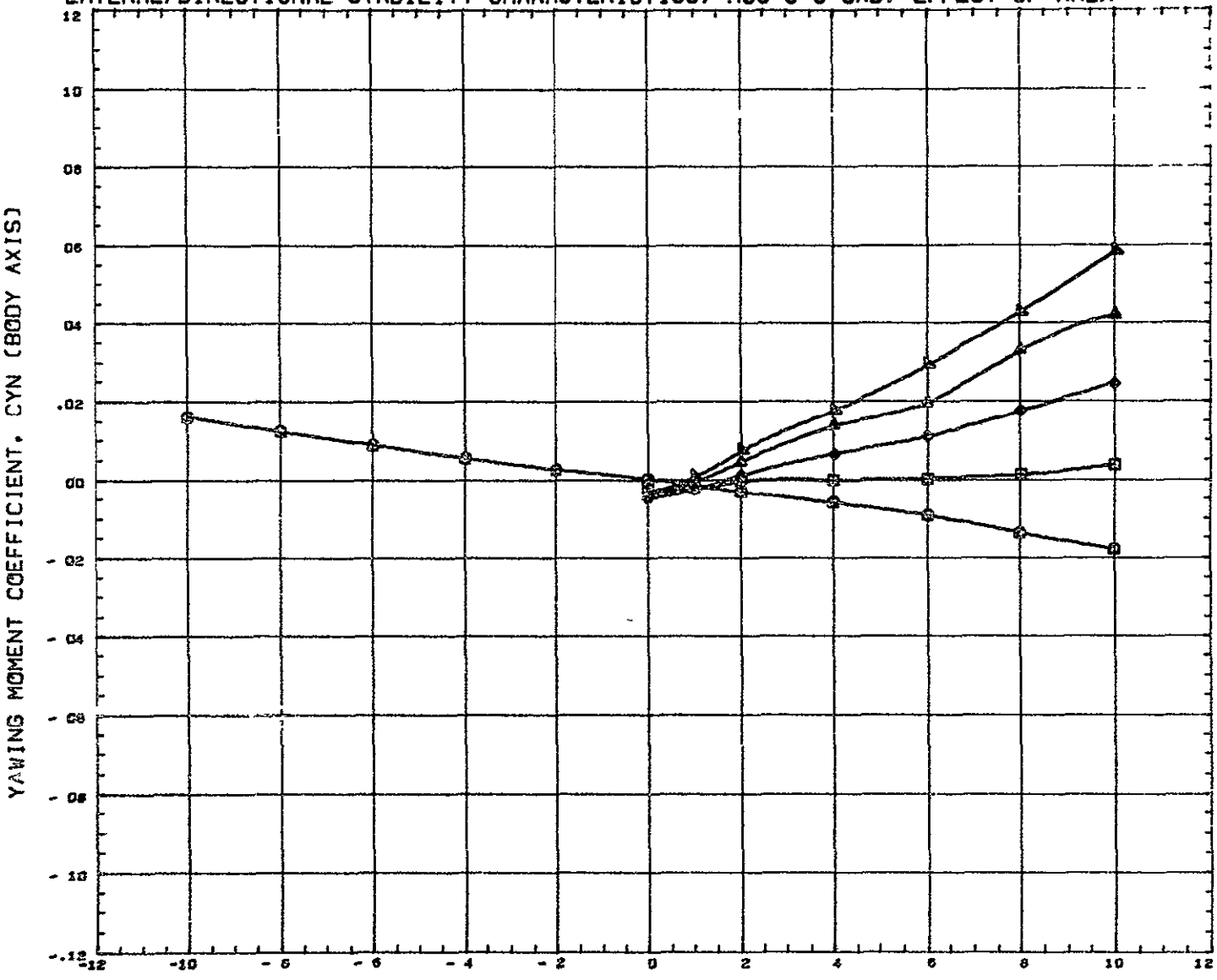
MACH	0.250	ASPECT	1.000
LSWEEP	45.000	TSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
□	200.000
□	300 000
◇	400 000
△	500 000
▷	600 000

PARAMETRIC VALUES

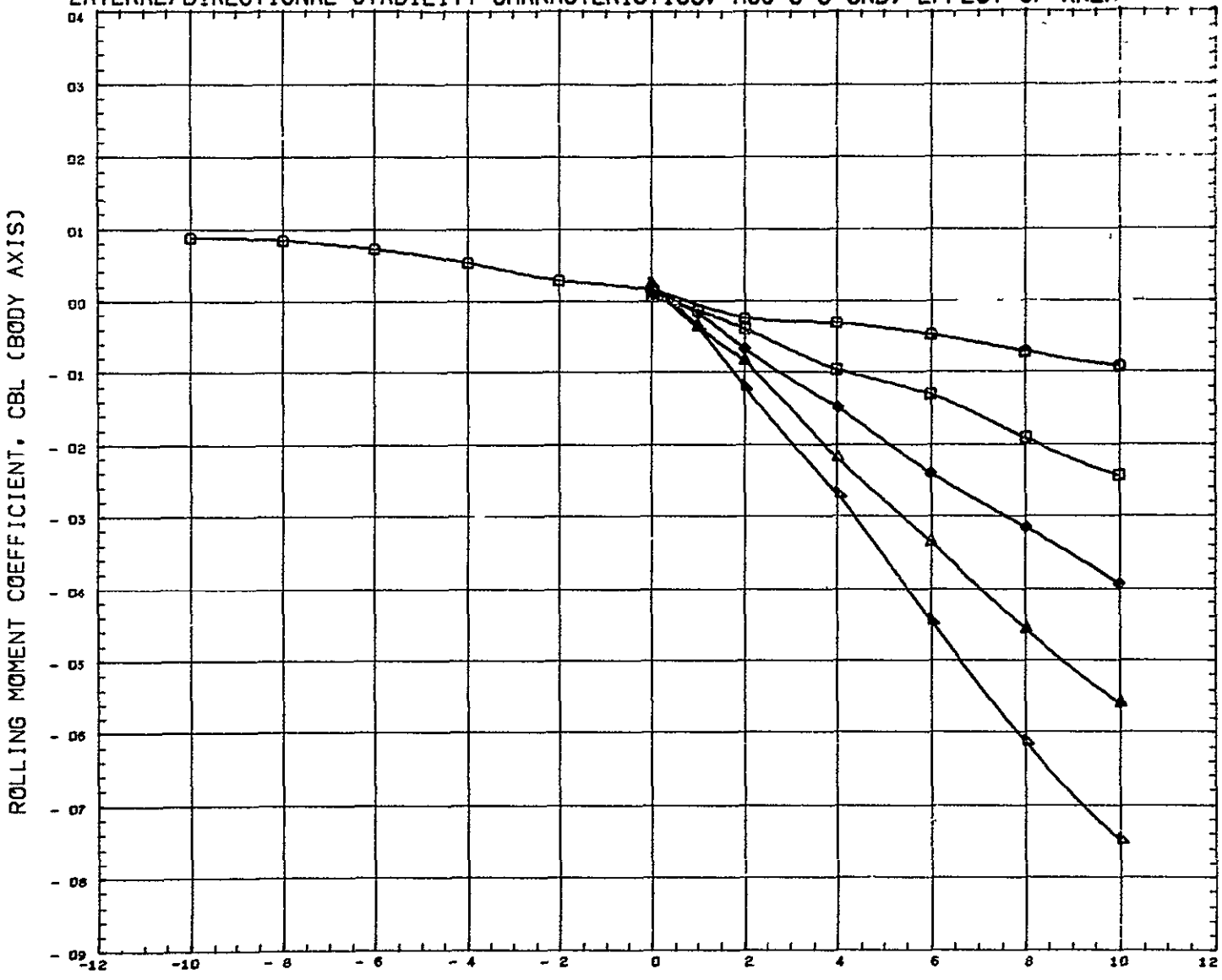
MACH	0 250	ASPECT	1 000
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	200.000
□	300.000
◇	400.000
△	500.000
▷	600.000

PARAMETRIC VALUES

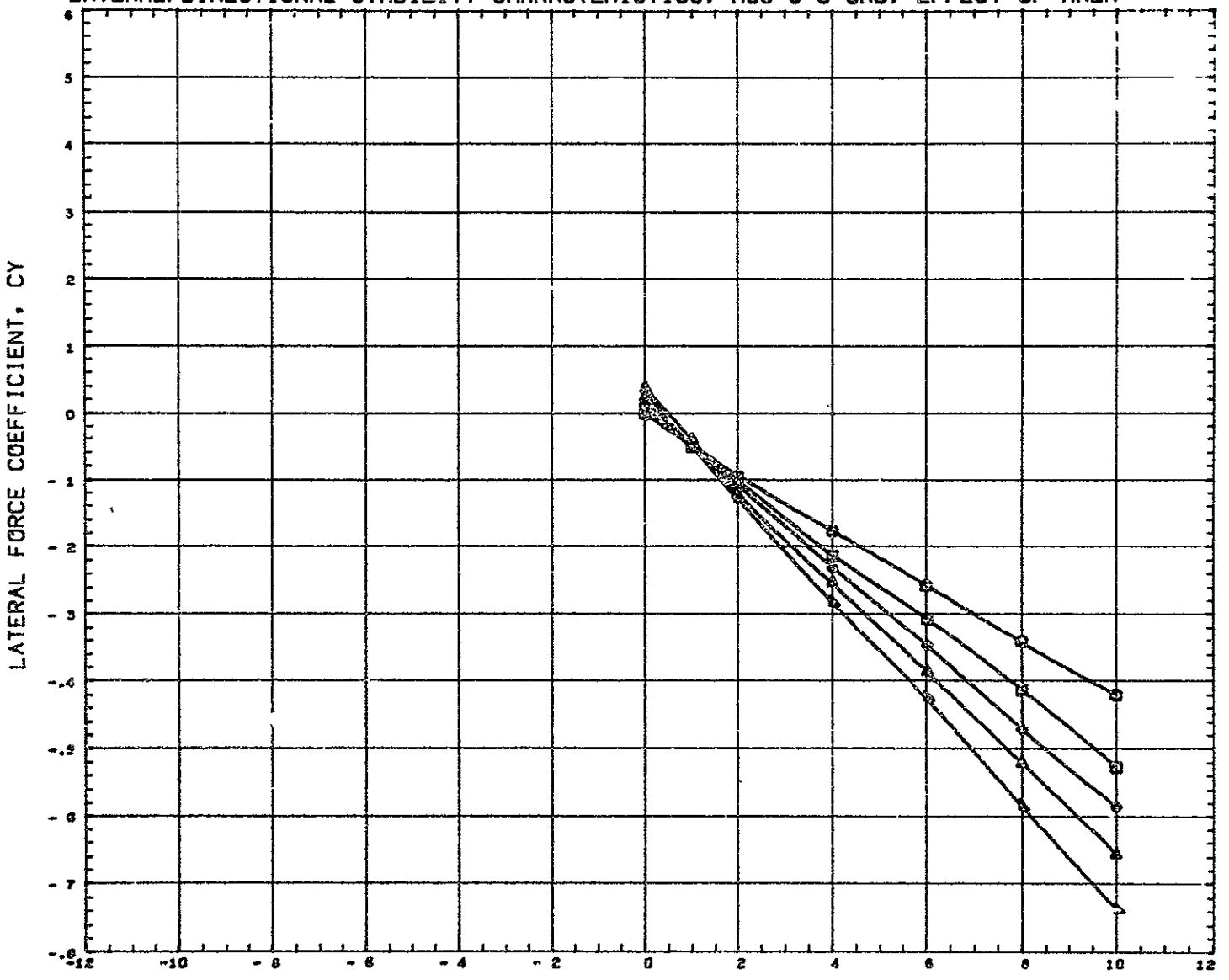
MACH	0.250	ASPECT	1.000
LSWEEP	45.000	TSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	200 000
□	300 000
◇	400 000
△	500 000
▷	600 000

PARAMETRIC VALUES

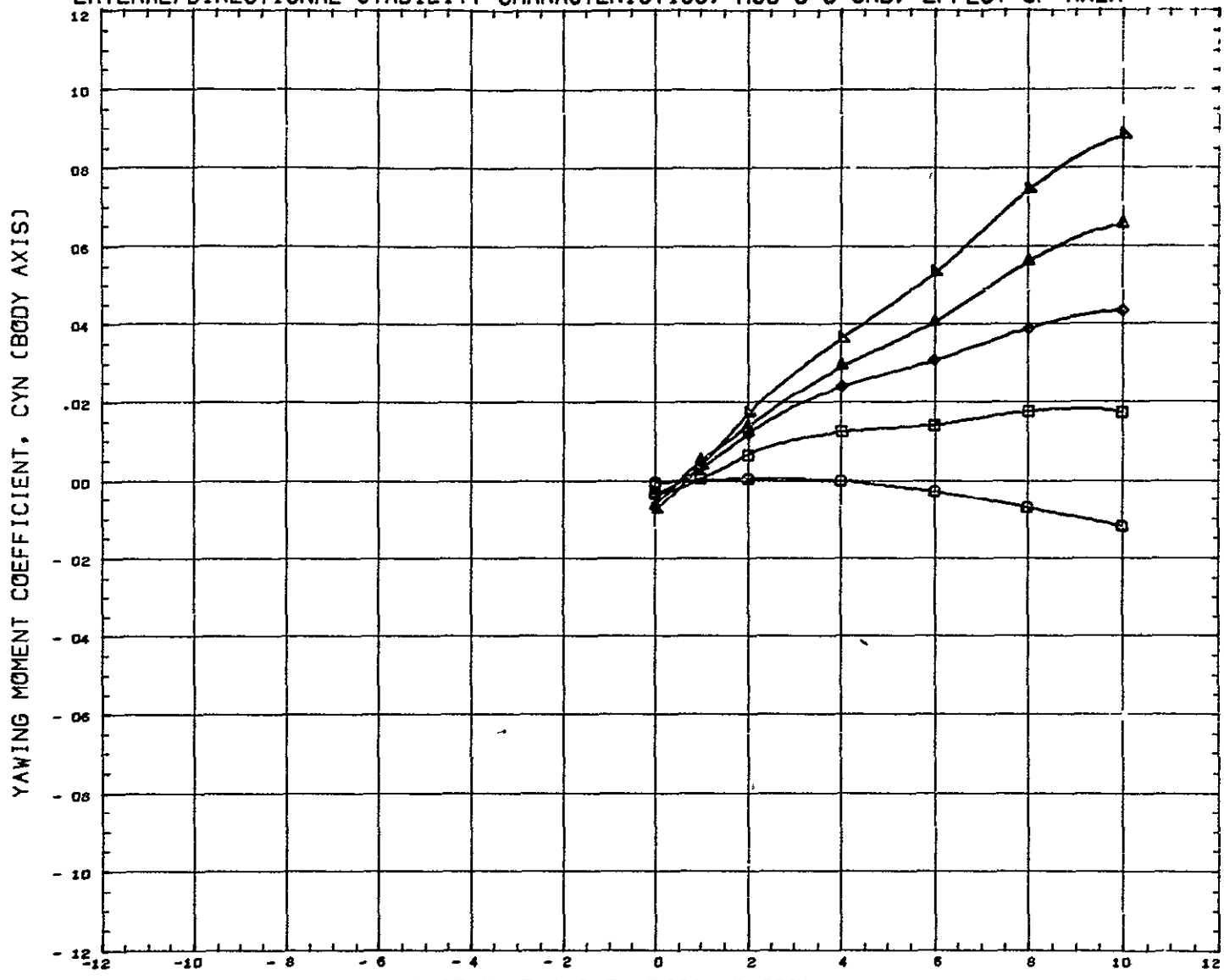
MACH	0 250	ASPECT	2 000
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 6750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	200 000
□	300 000
◇	400 000
△	500 000
◇	600 000

PARAMETRIC VALUES

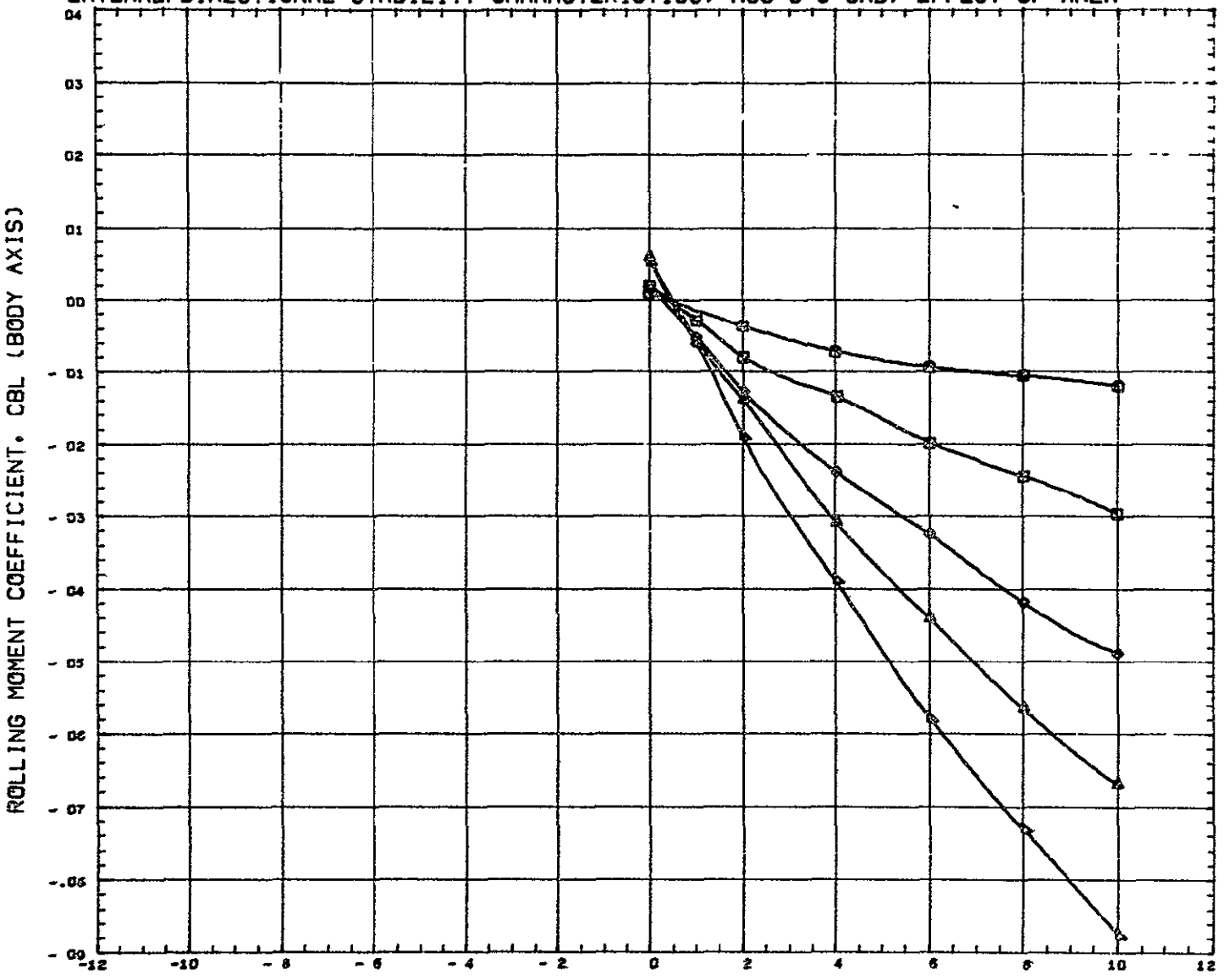
MACH	0 250	ASPECT	2 000
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	200.000
□	500.000
◇	400.000
△	300.000
▷	600.000

PARAMETRIC VALUES

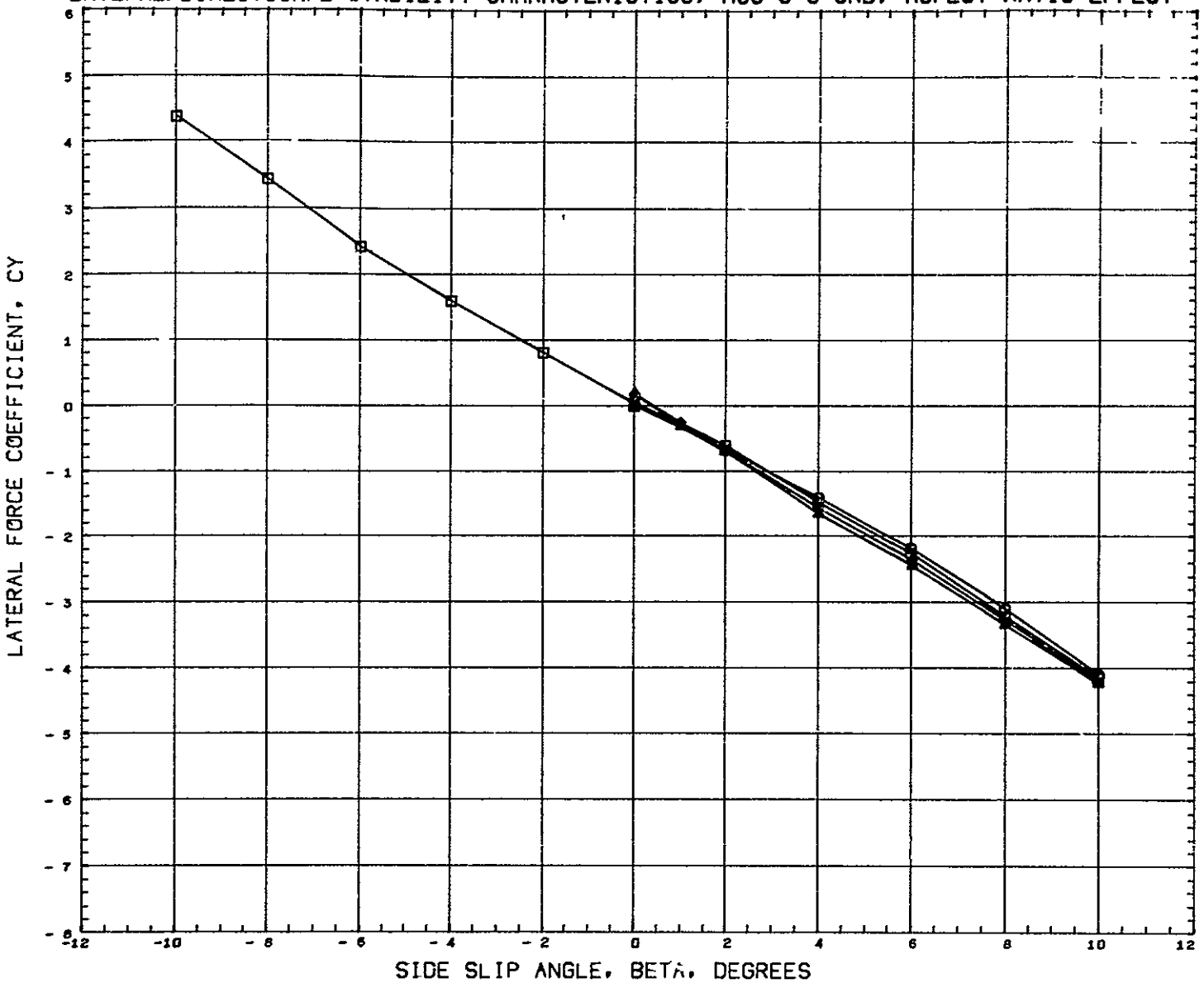
MACH	0.250	ASPECT	2.000
LSWEEP	45.000	TSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT



SYMBOL	ASPECT
○	0 500
□	1 000
◇	1 500
△	2 000

PARAMETRIC VALUES

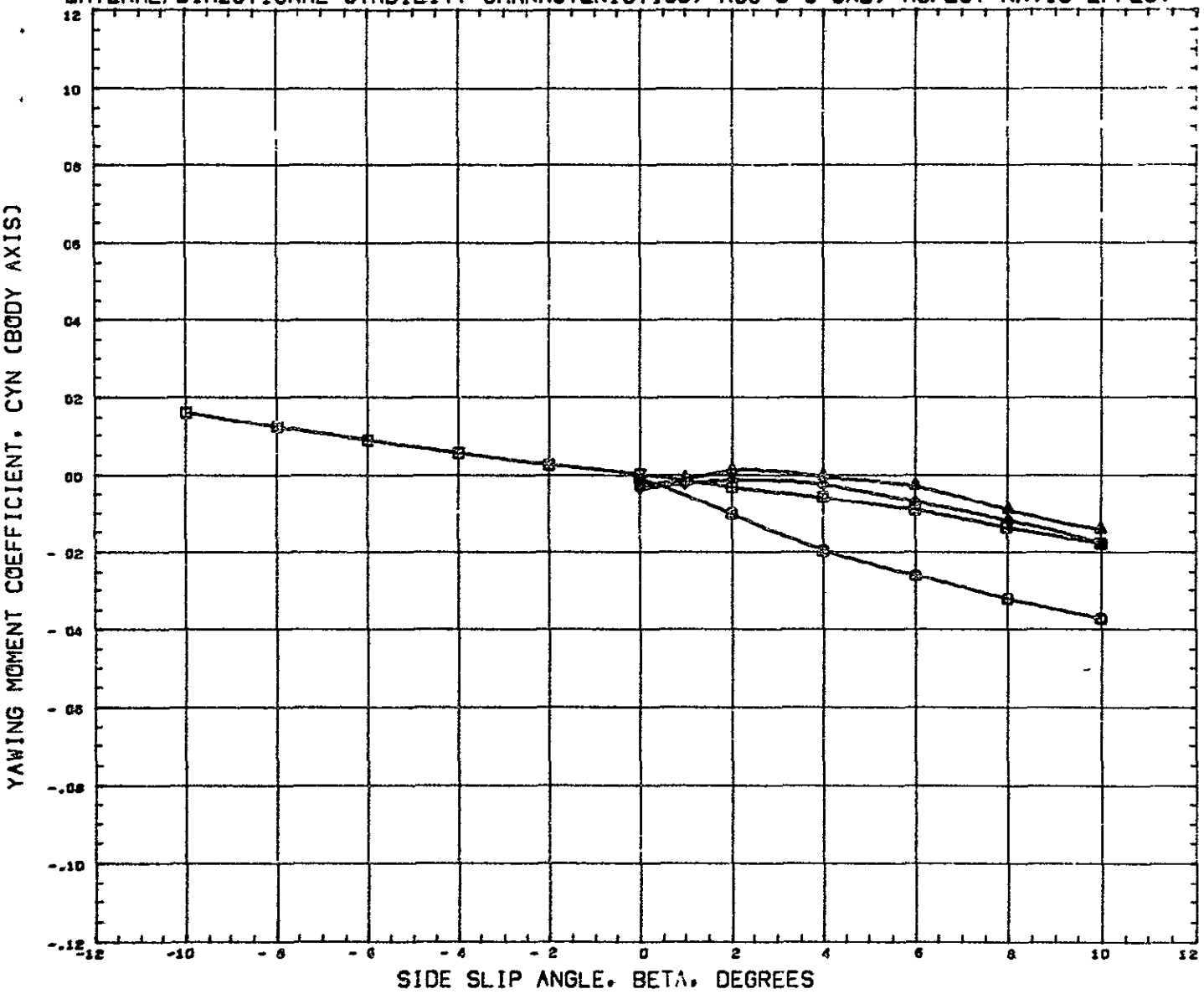
MACH	0 250	AREA	200 000
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT



SYMBOL	ASPECT
○	0 500
□	1 000
◇	1.500
△	2.000

PARAMETRIC VALUES

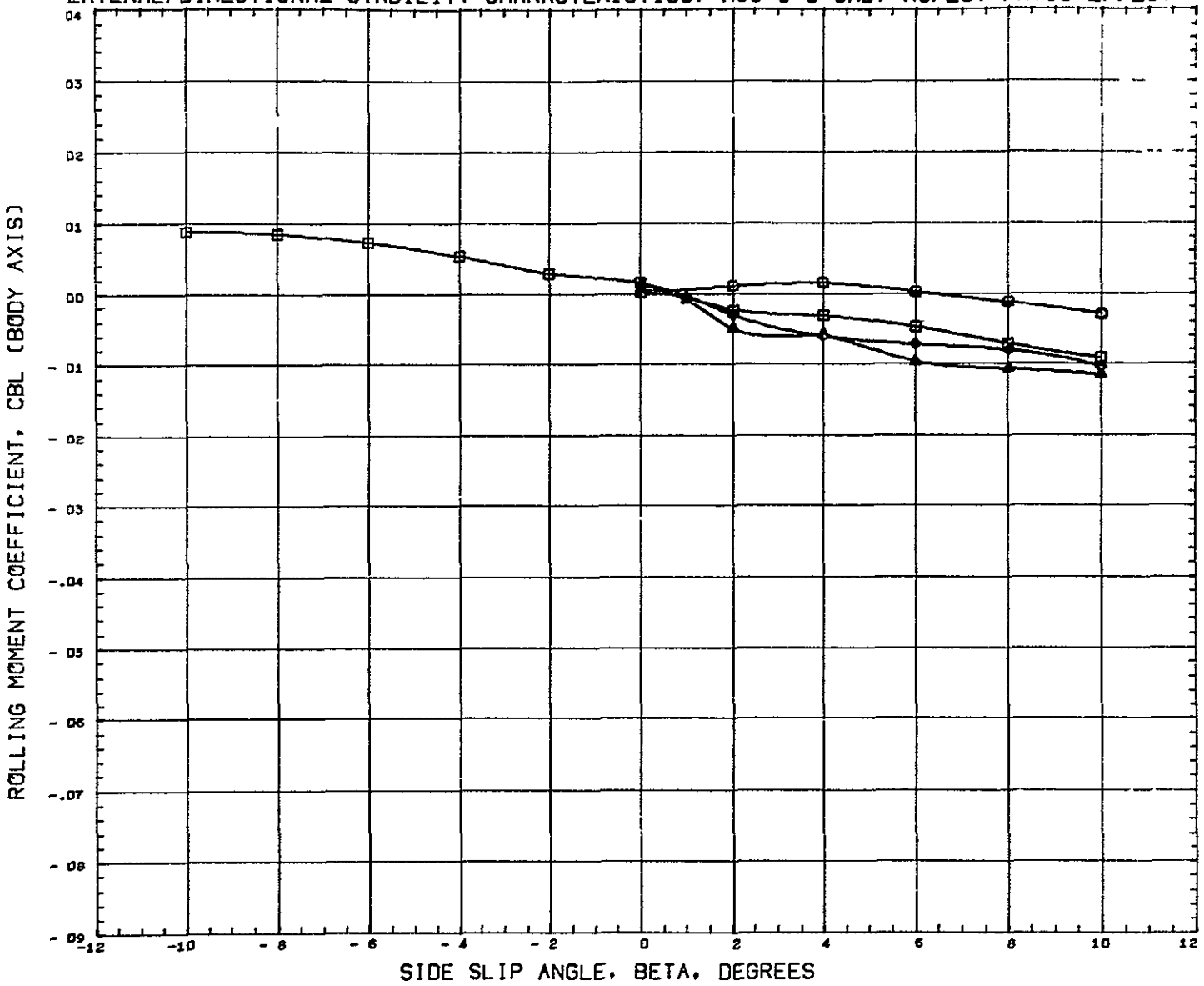
MACH	0 250	AREA	200 000
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT



SYMBOL	ASPECT
○	0.500
□	1.000
◇	1.500
△	2.000

PARAMETRIC VALUES

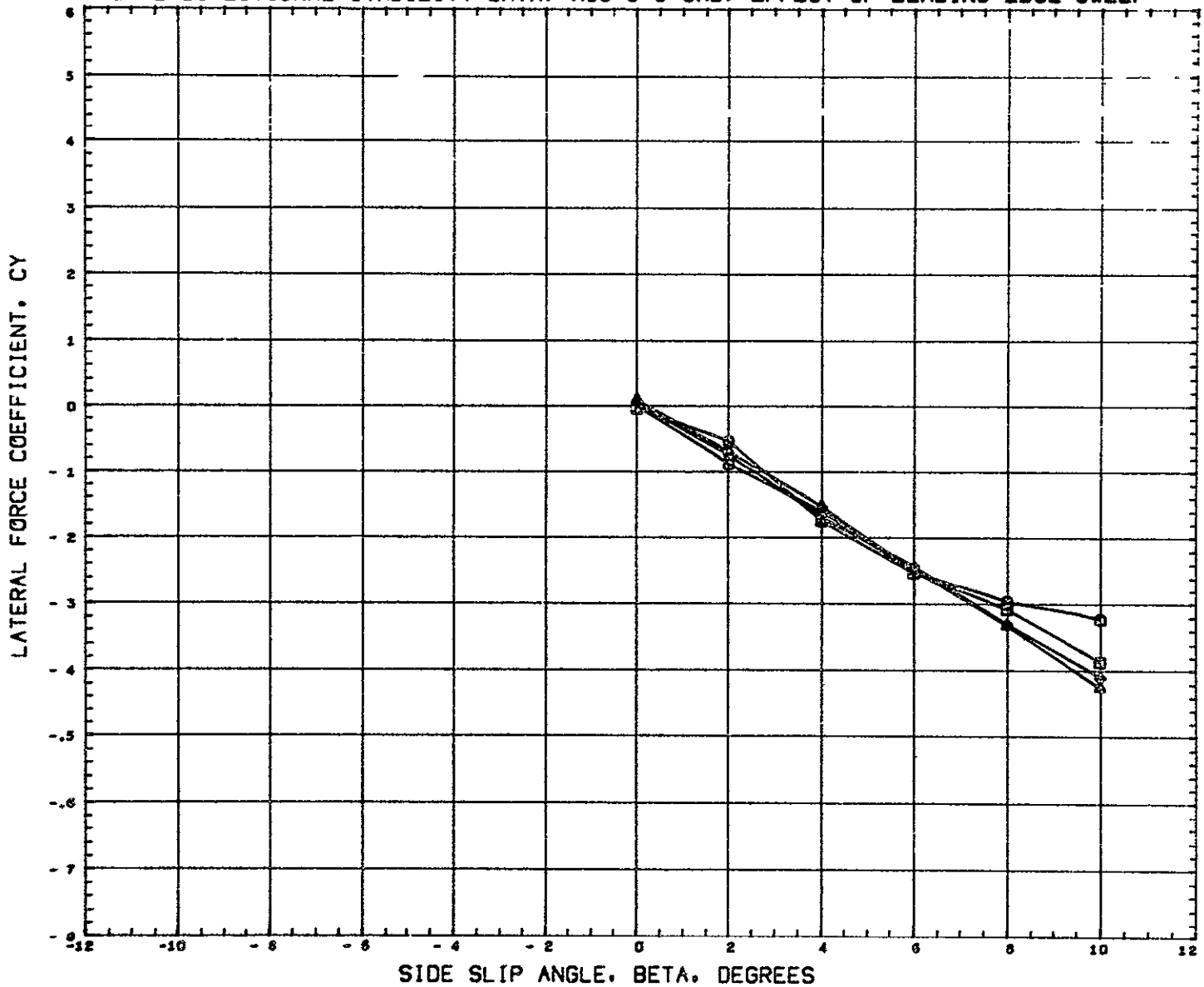
MACH	0.250	AREA	200.000
LSWEEP	45.000	TSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF LEADING EDGE SWEEP



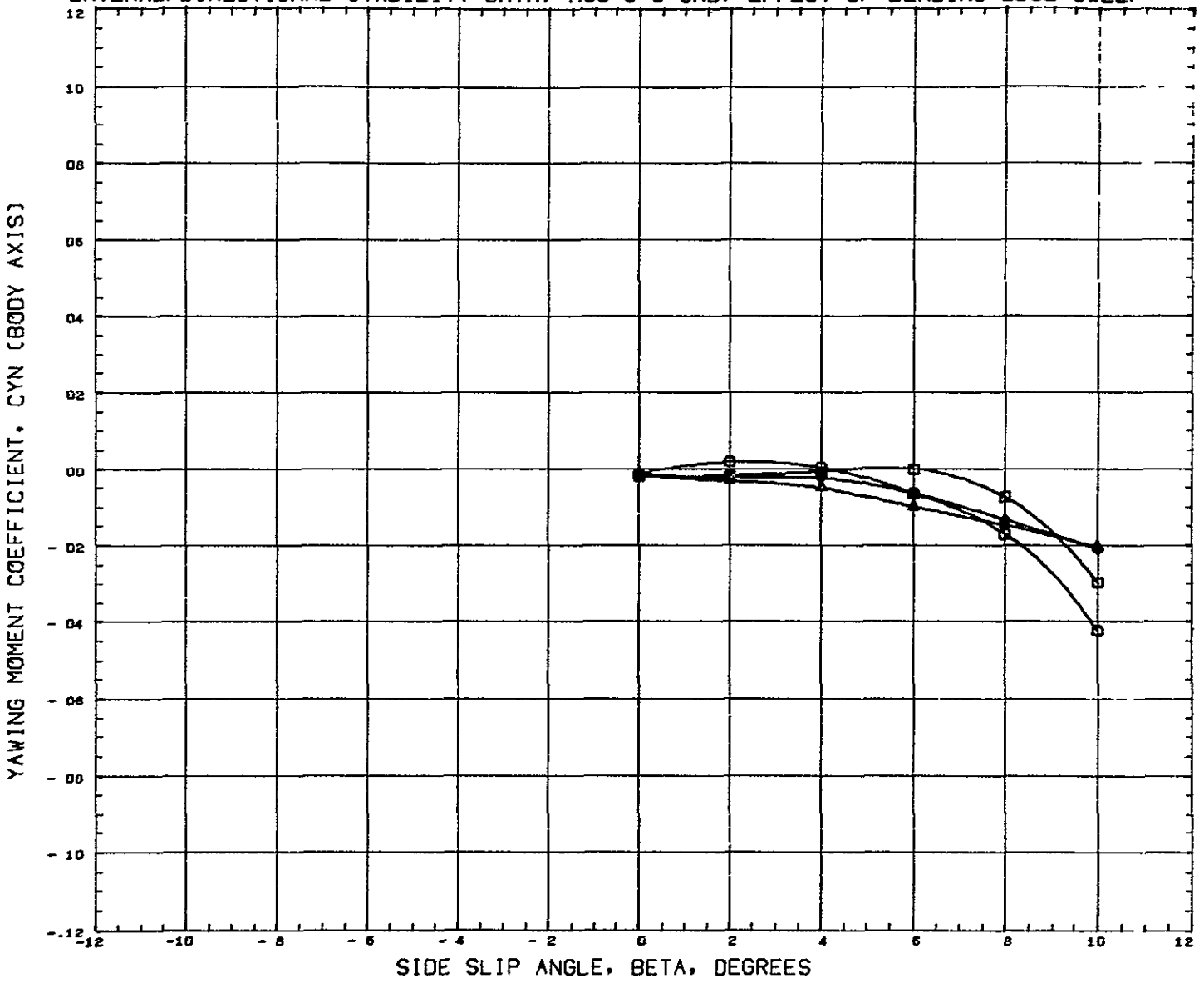
SYMBOL	LSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	2.000	TSWEEP	0.000
◇	30.000	ALPHA	2.000		
△	45.000				

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF LEADING EDGE SWEEP



SYMBOL	LSWEEP
○	0 000
□	15 000
◇	30 000
△	45 000

PARAMETRIC VALUES

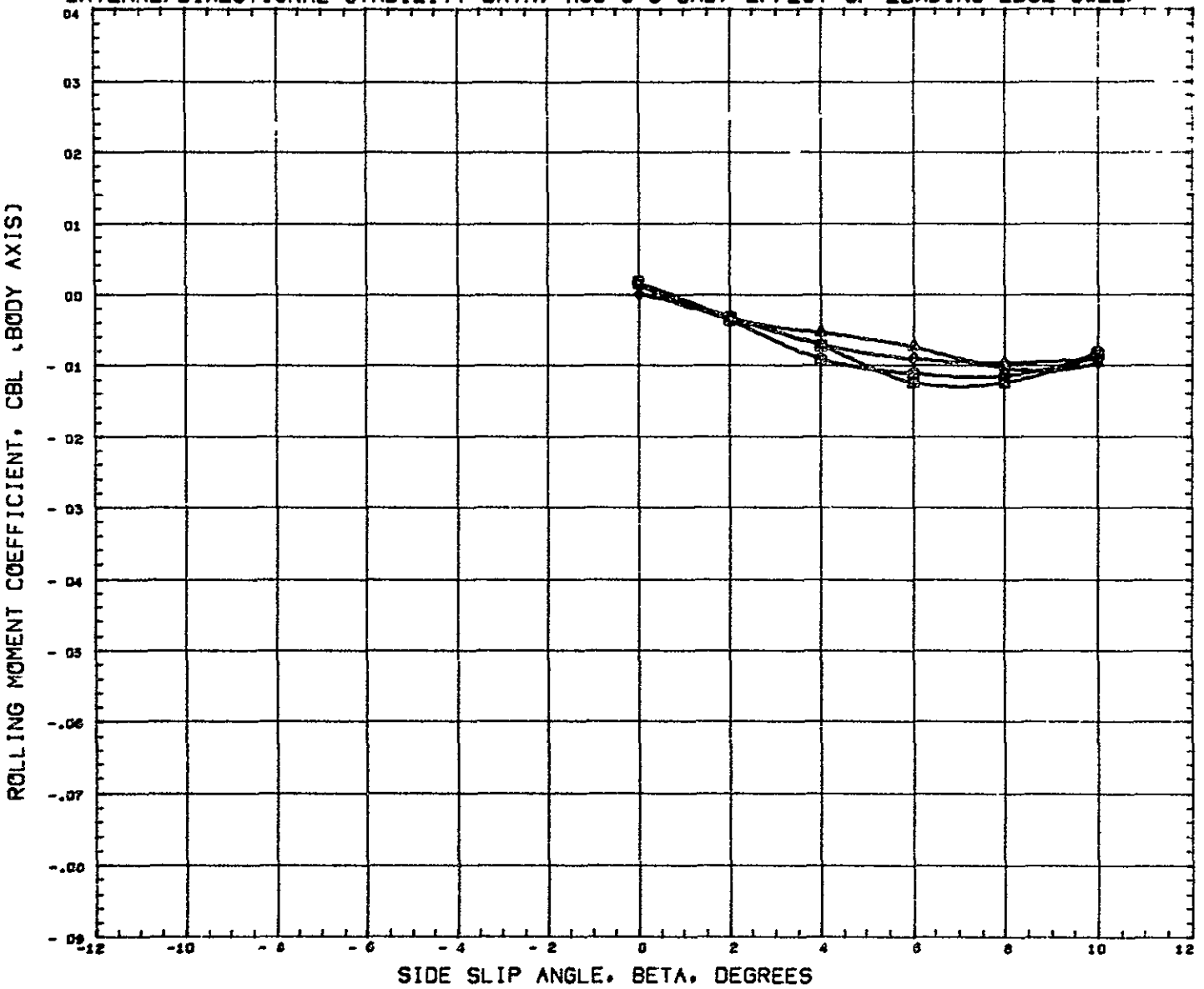
MACH	0 250	AREA	200 000
ASPECT	2 000	TSWEEP	0 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF LEADING EDGE SWEEP



SYMBOL	LSWEEP
○	0.000
□	15.000
◇	30.000
△	45.000

PARAMETRIC VALUES

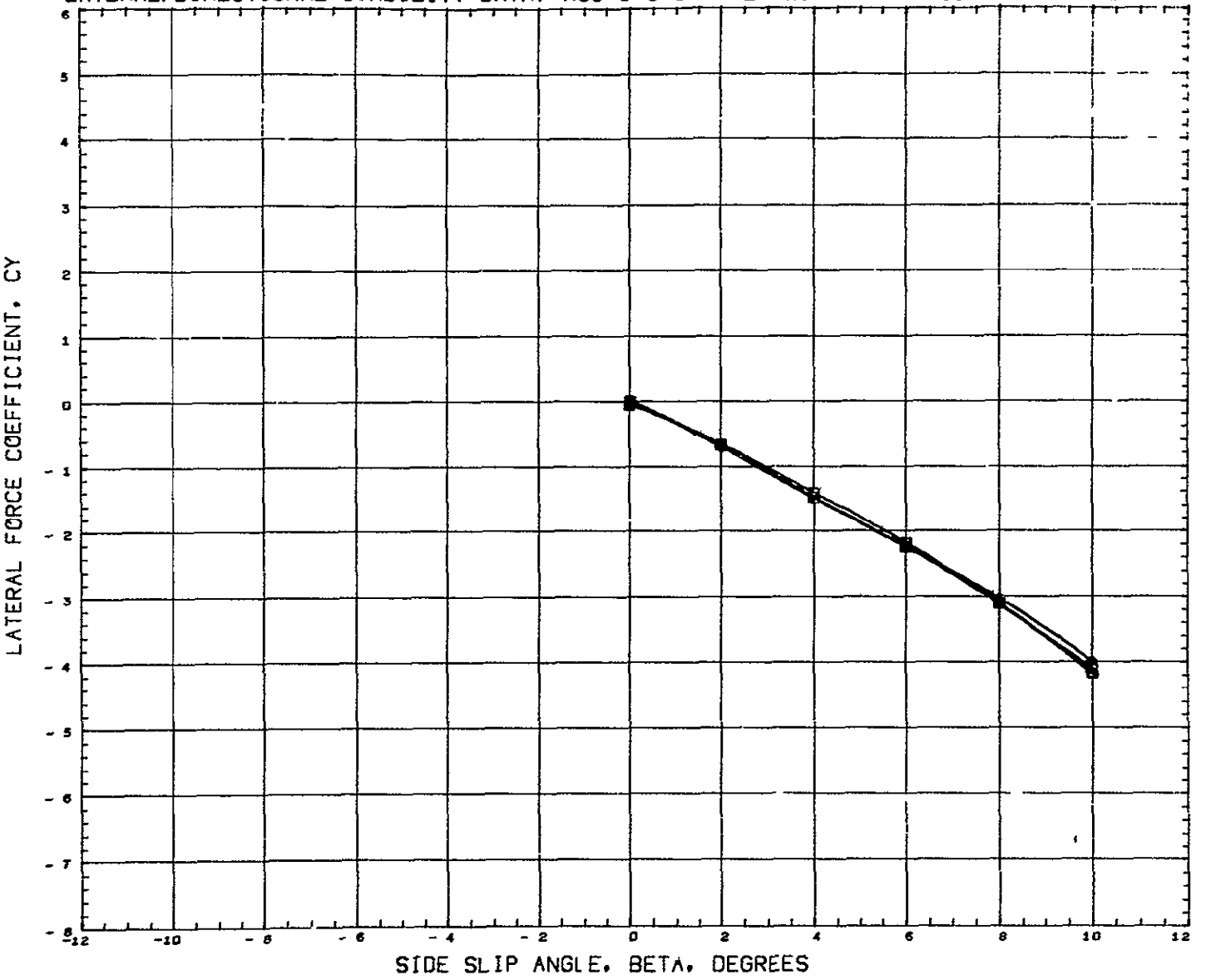
MACH	0.250	AREA	200.000
ASPECT	2.000	TSWEEP	0.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

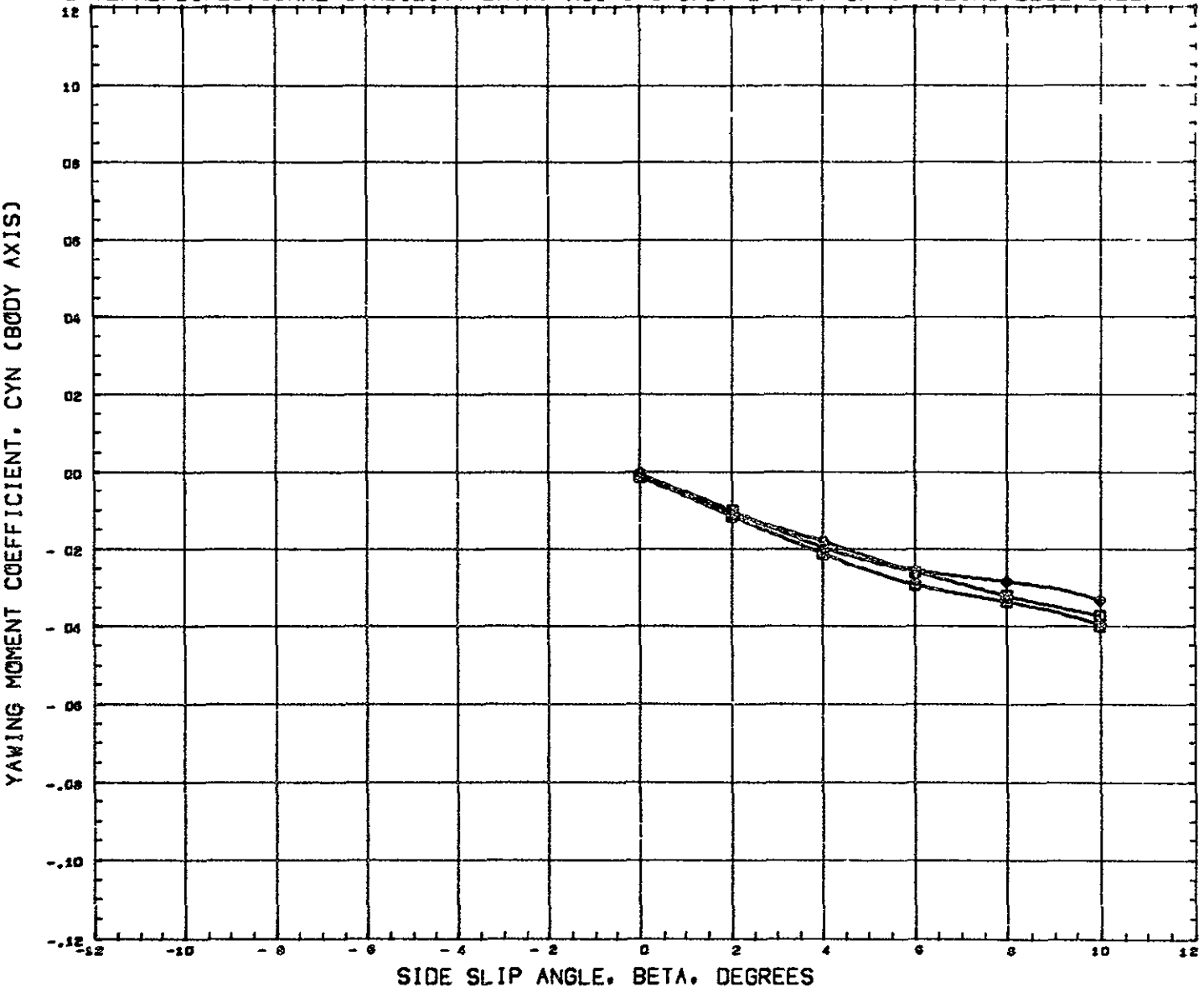


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



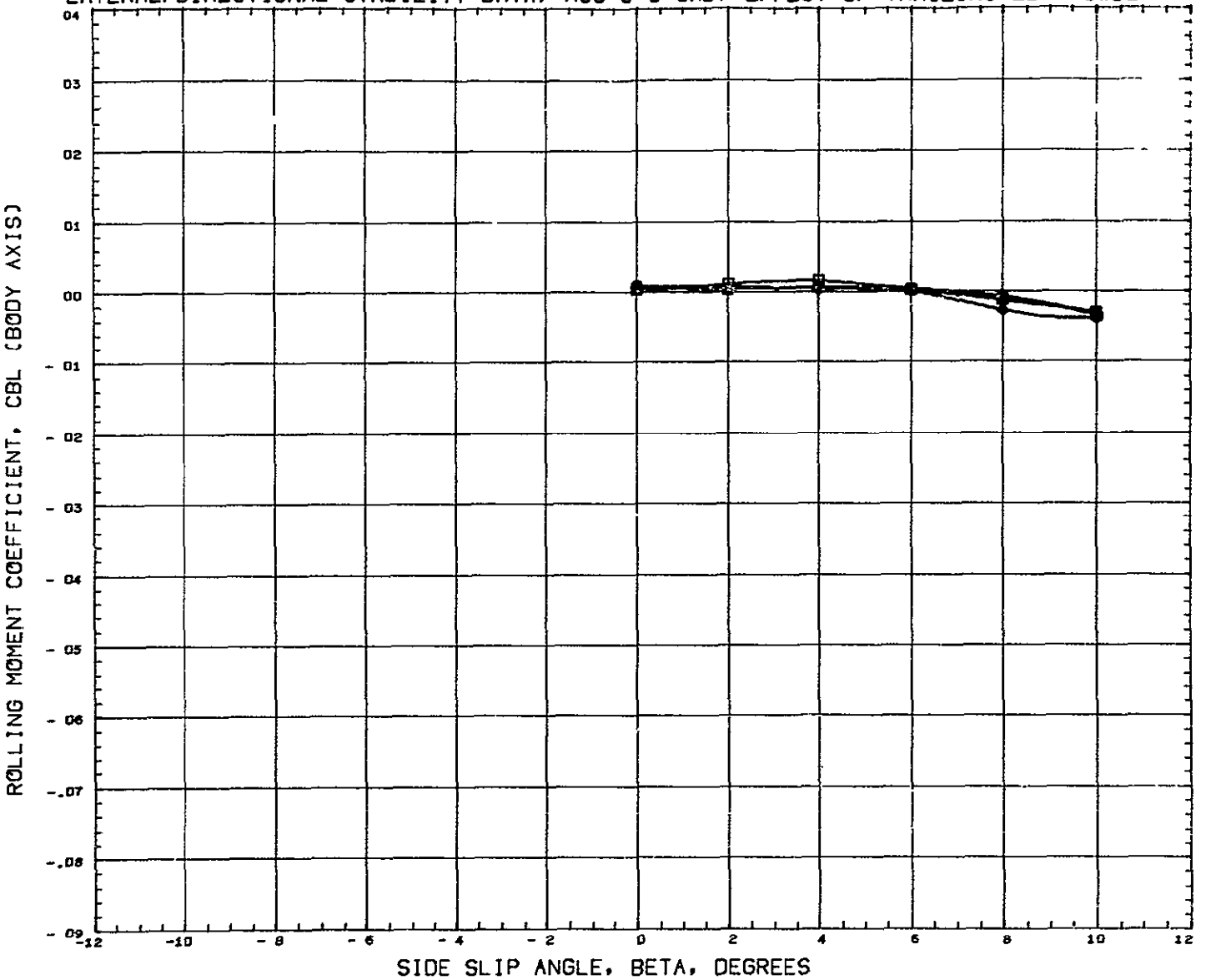
SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0 000	MACH	0 250	AREA	200 000
□	15 000	ASPECT	0 500	LSWEEP	45 000
◇	30 000	ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

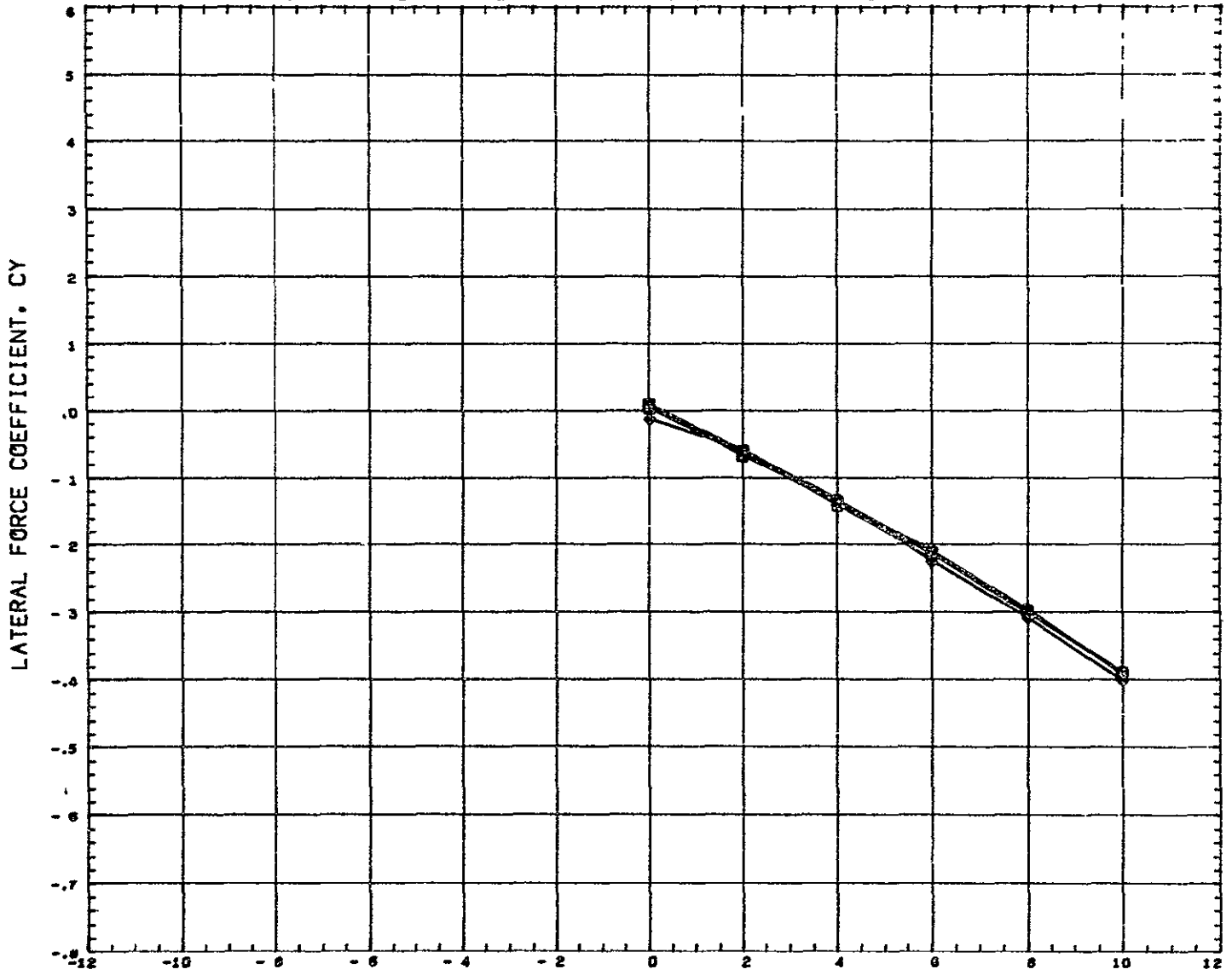


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

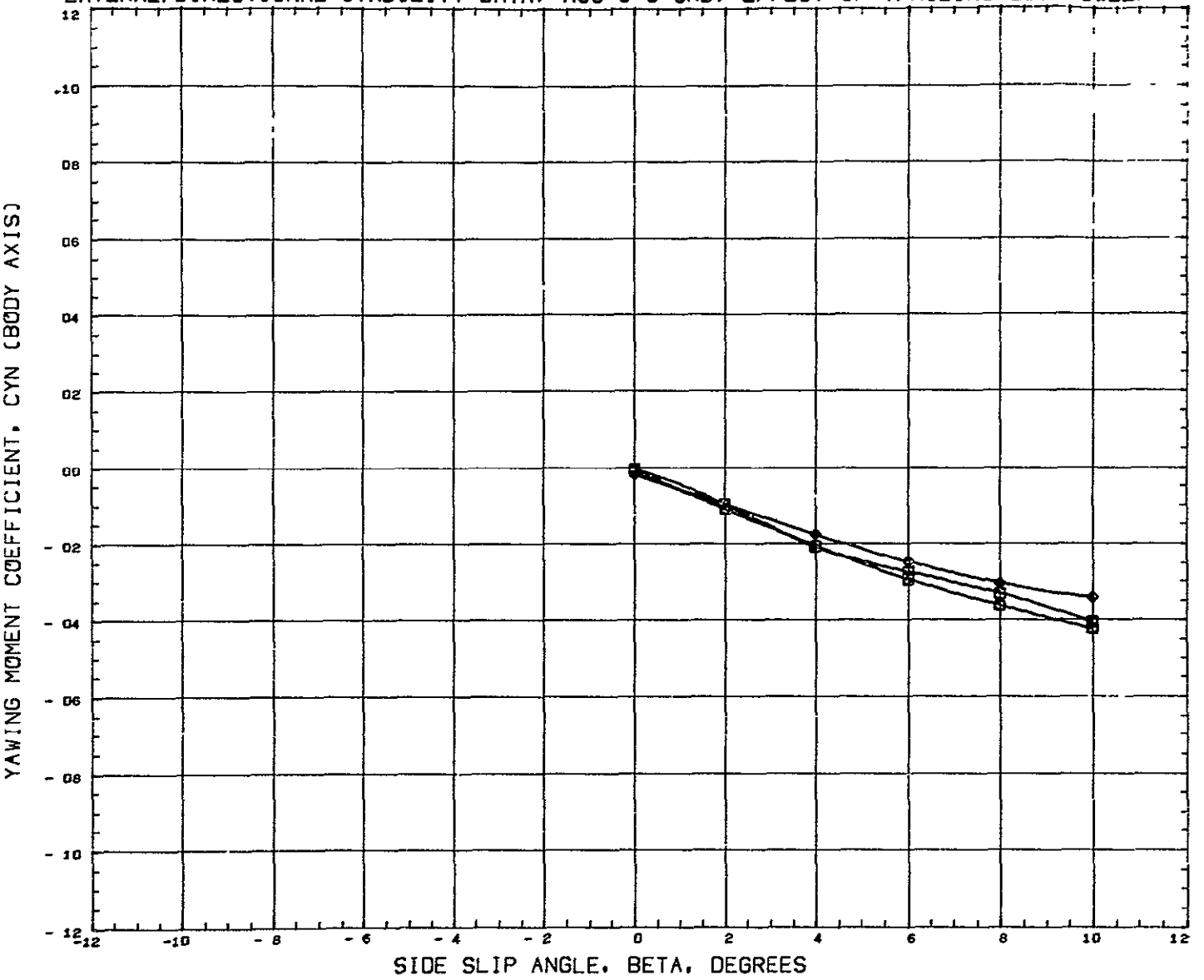


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

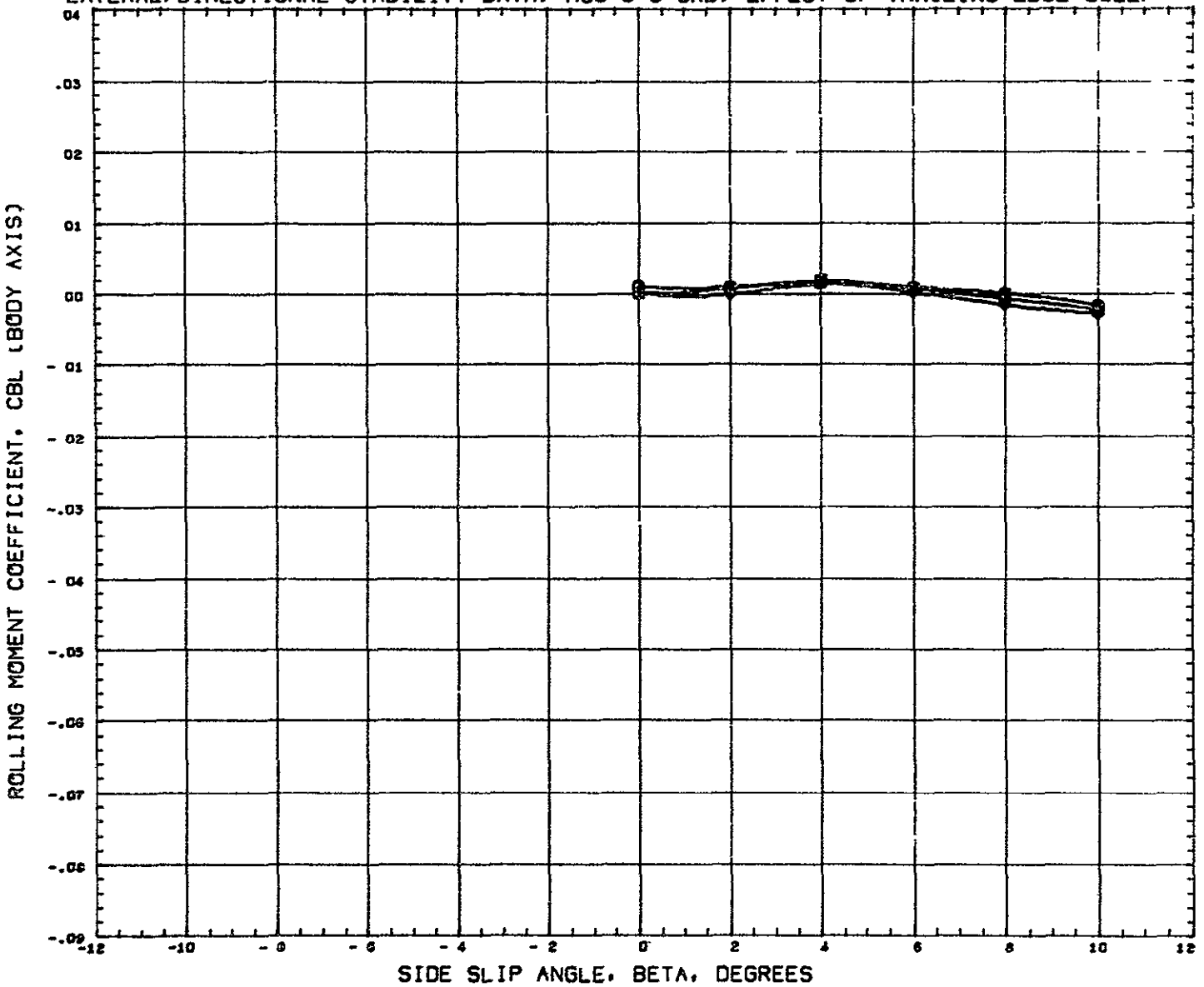


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

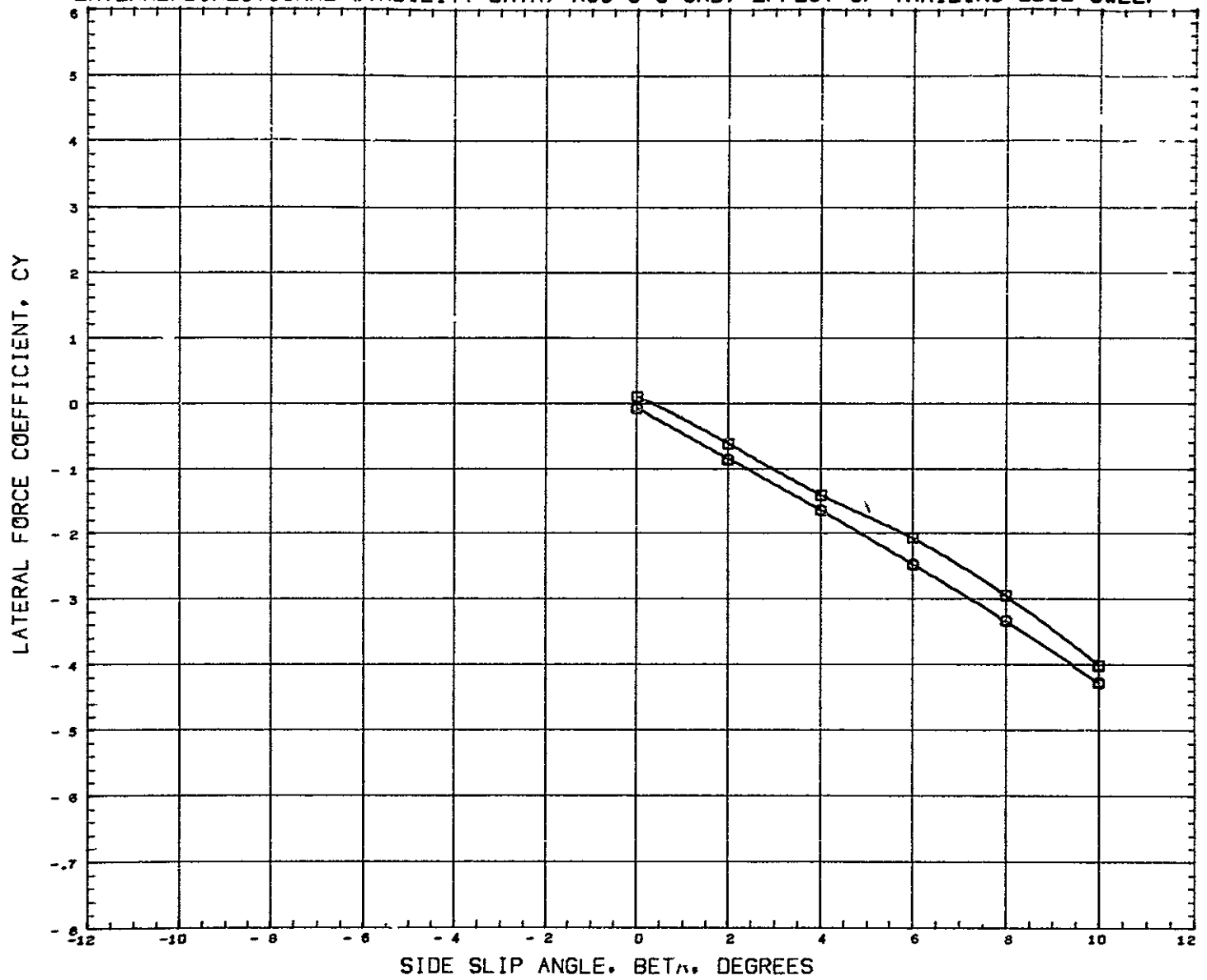


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2306	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
○	0.000
□	15.000

PARAMETRIC VALUES

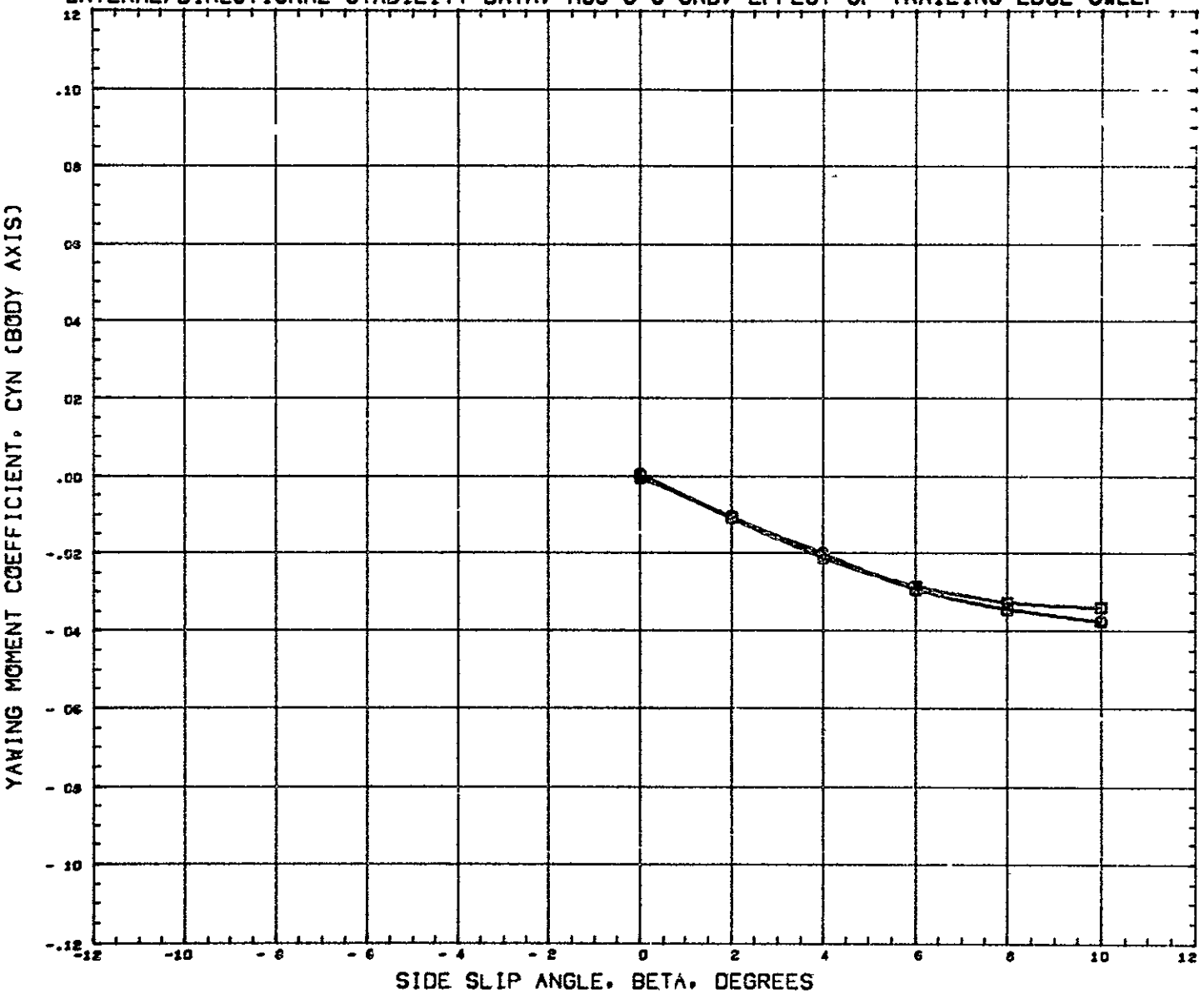
MACH	0.250	AREA	200.000
ASPECT	0.500	LSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

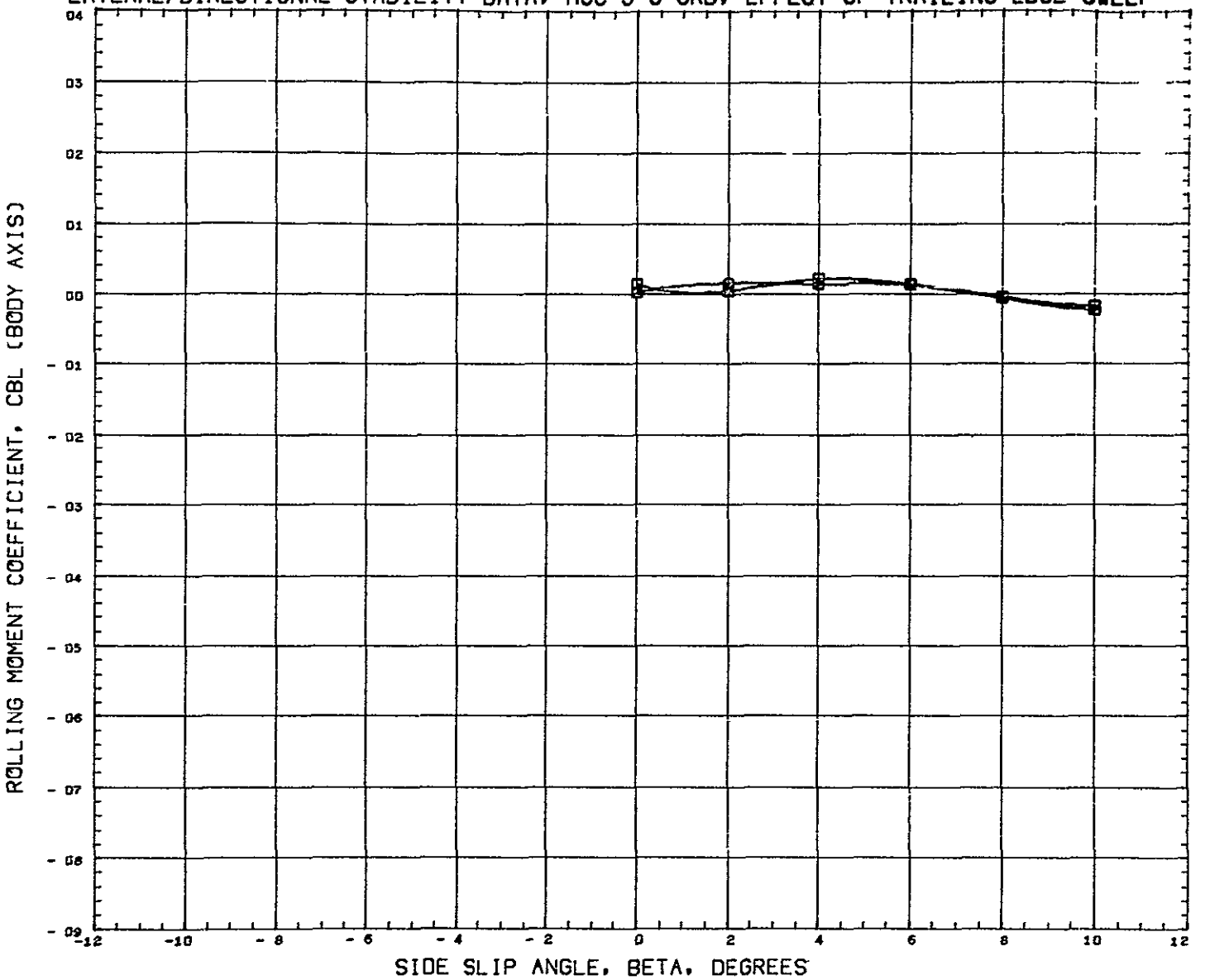


SYMBOL	TSWEEP		PARAMETRIC VALUES		
O	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	0.500	LSWEEP	15.000
		ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
O	0 000
□	15 000

PARAMETRIC VALUES

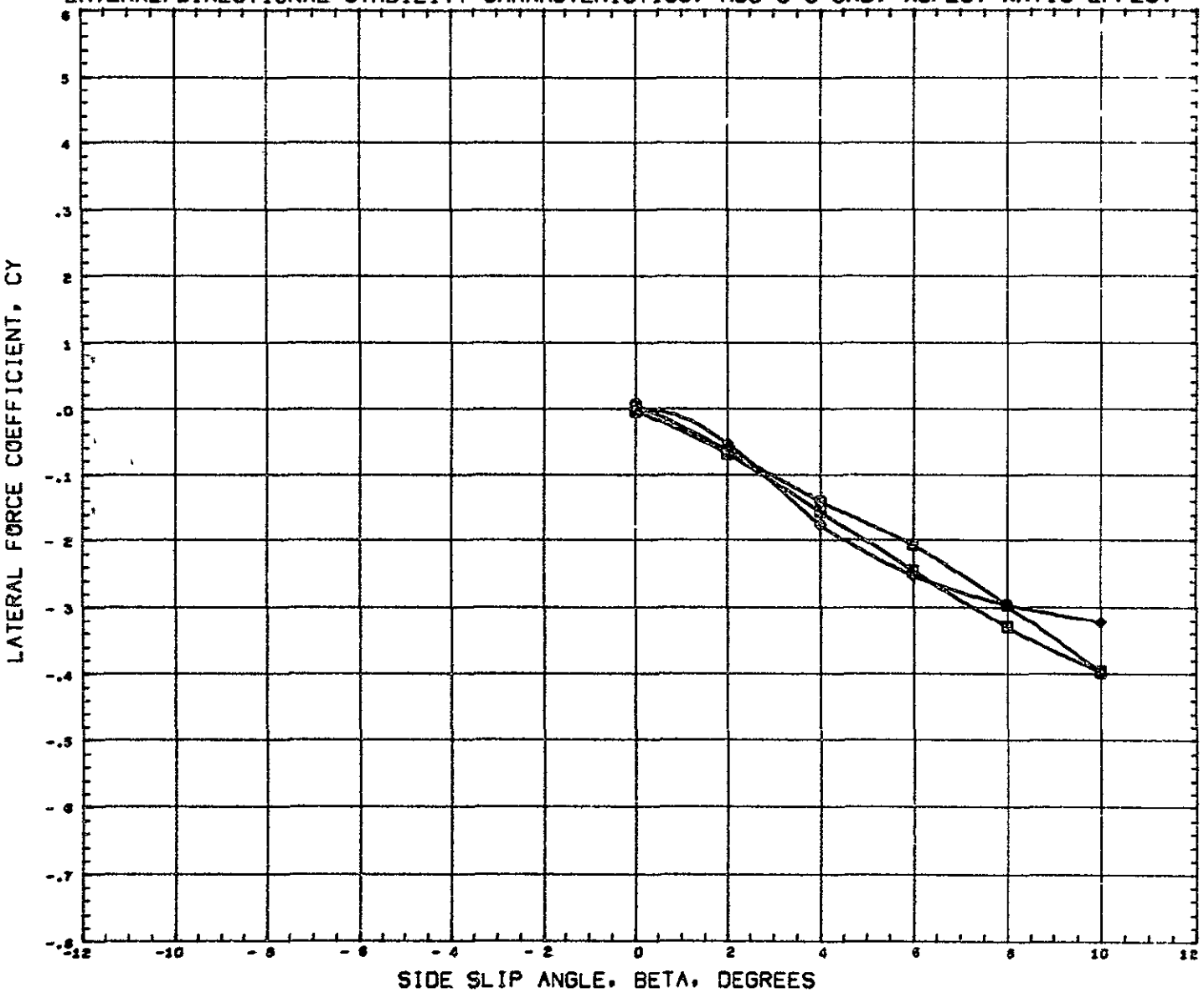
MACH	0 250	AREA	200 000
ASPECT	0 500	LSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT

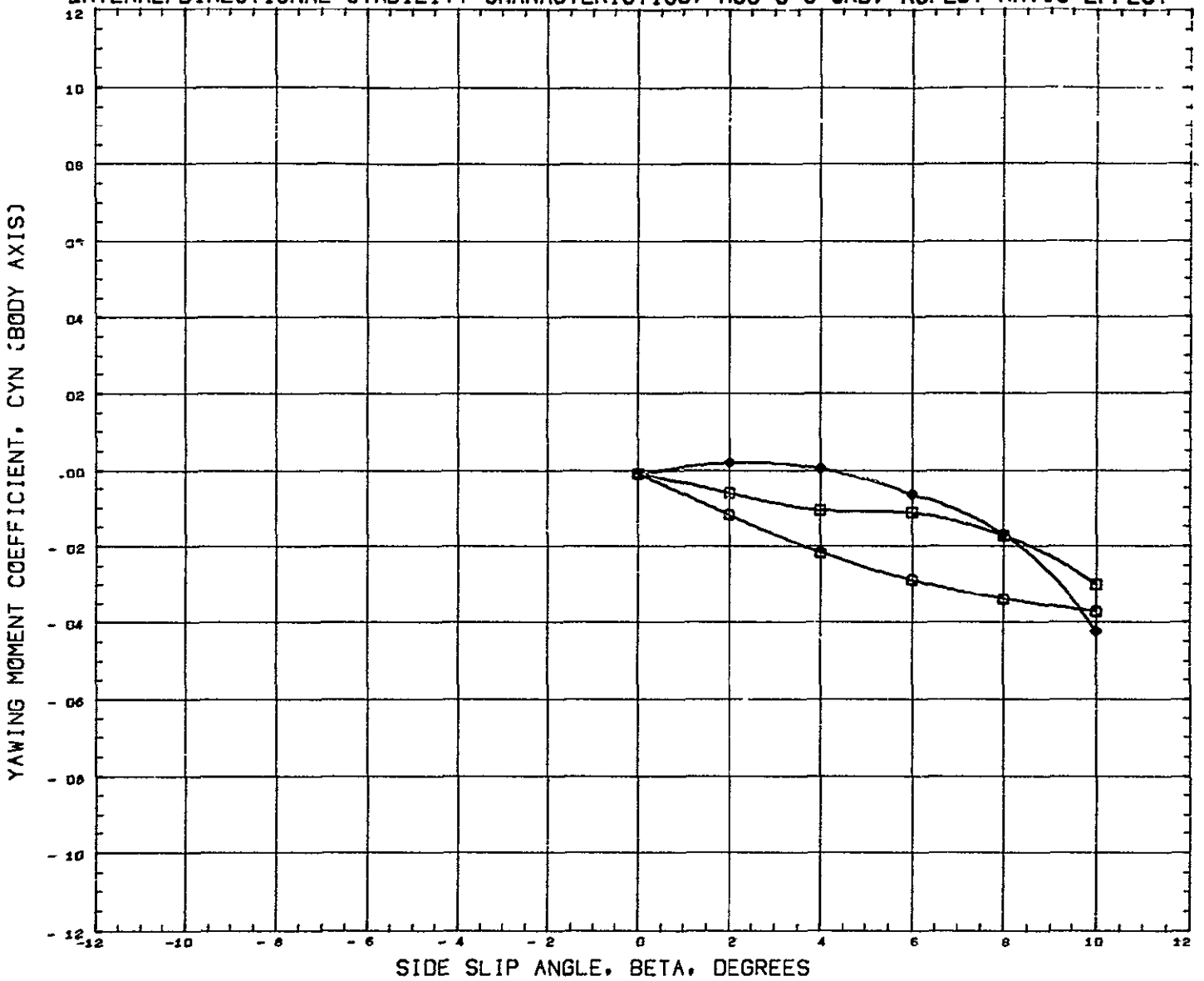


SYMBOL	ASPECT		PARAMETRIC VALUES		
○	0 500	MACH	0.250	AREA	200.000
□	1 000	LSWEEP	0.000	TSWEEP	0.000
◇	2 000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT



SYMBOL	ASPECT
○	0 500
□	1 000
◇	2.000

PARAMETRIC VALUES

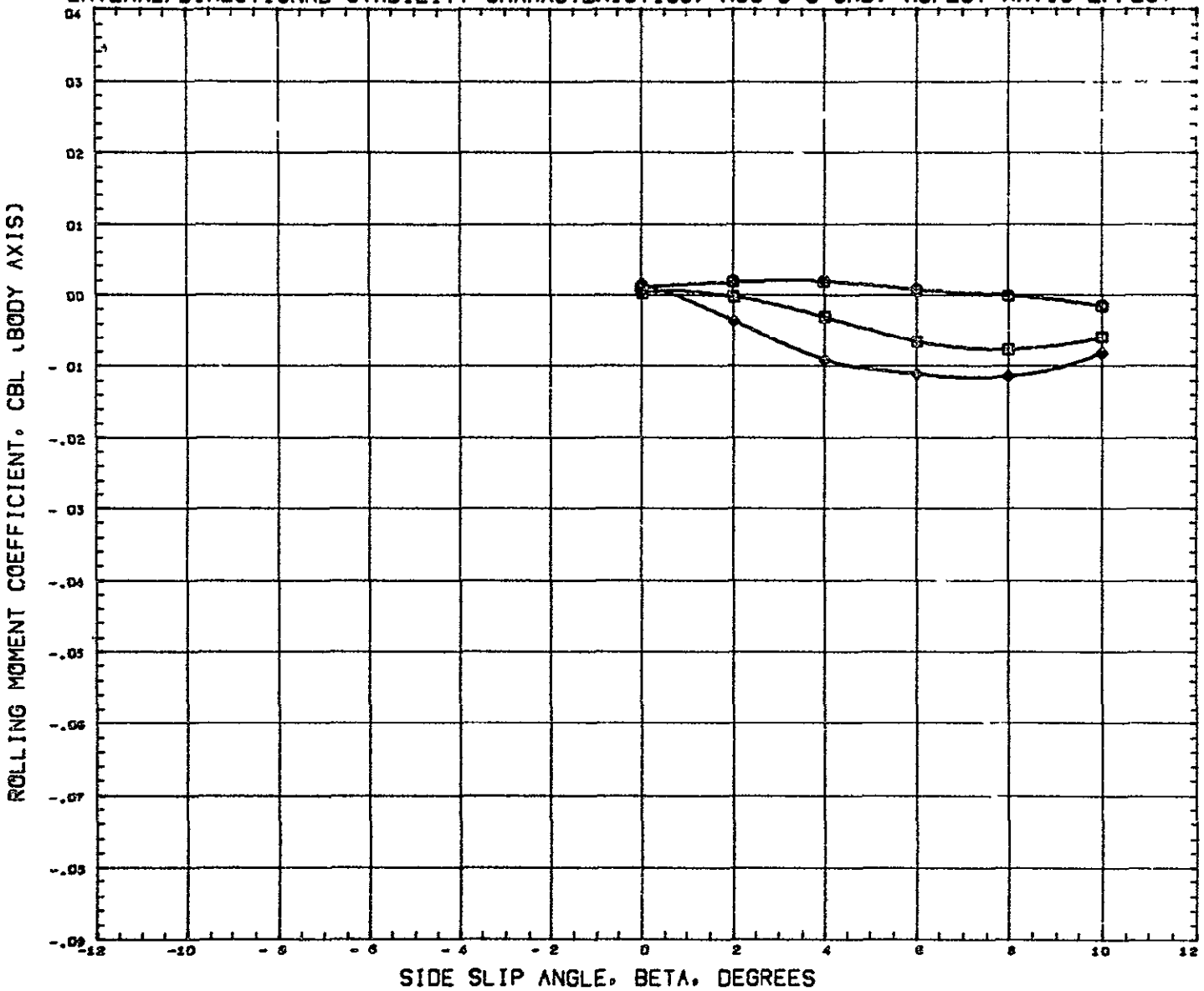
MACH	0 250	AREA	200 000
LSWEEP	0 000	TSWEEP	0 000
ALPHA	2 000		

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, ASPECT RATIO EFFECT



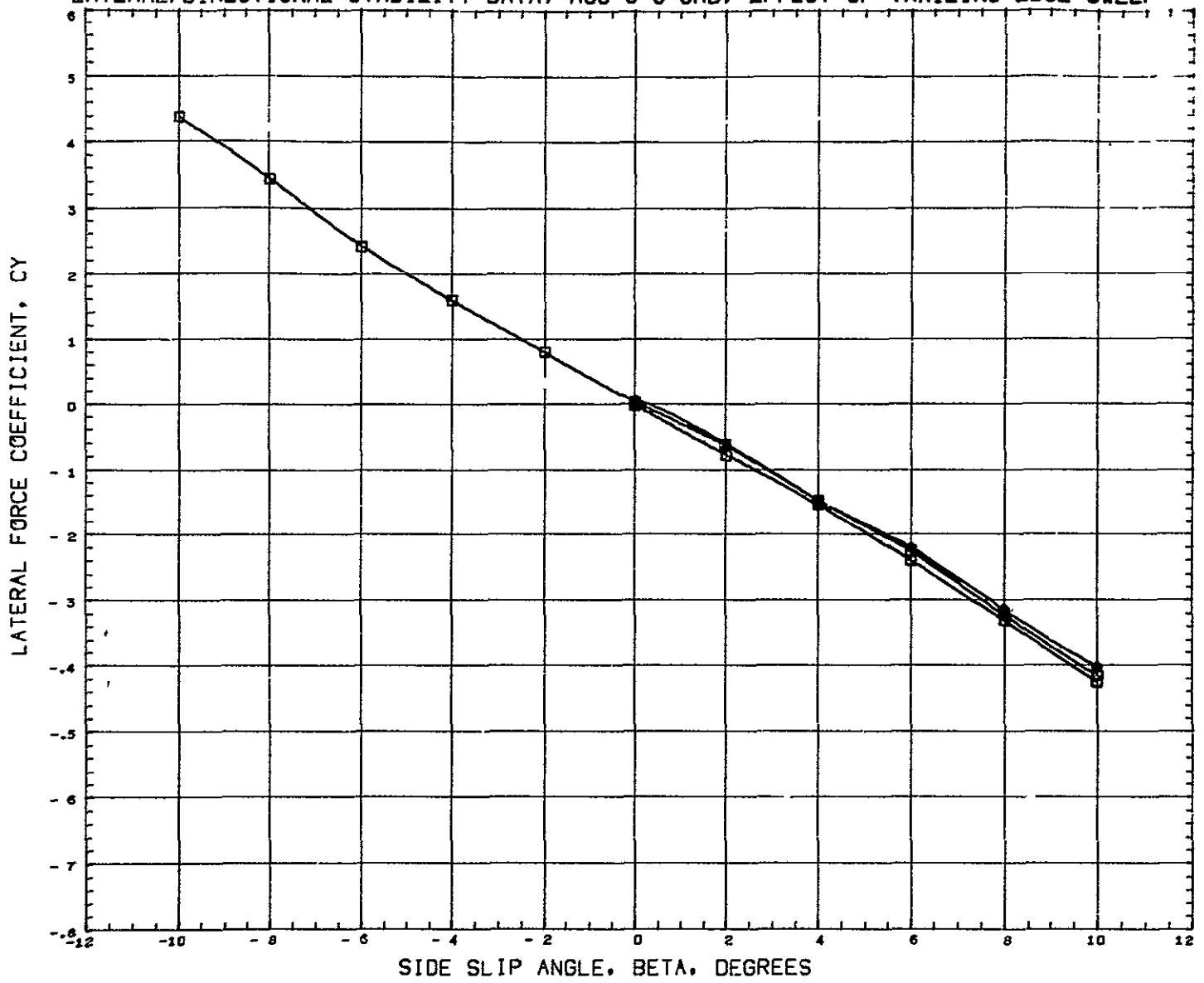
SYMBOL	ASPECT		PARAMETRIC VALUES		
□	0.500	MACH	0.250	AREA	200.000
□	1.000	LSWEEP	0.000	TSWEEP	0.000
◇	2.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

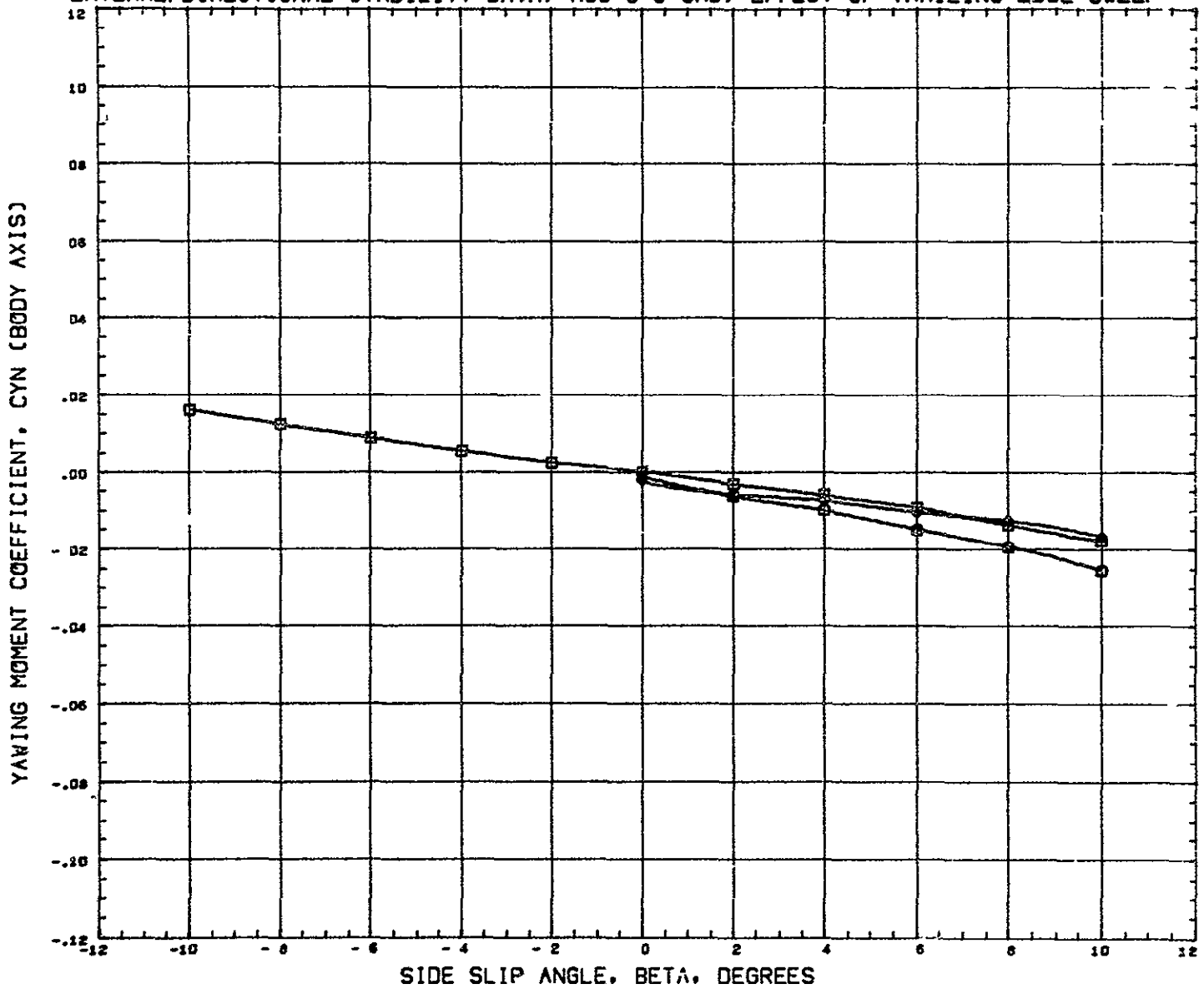


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	1.000	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

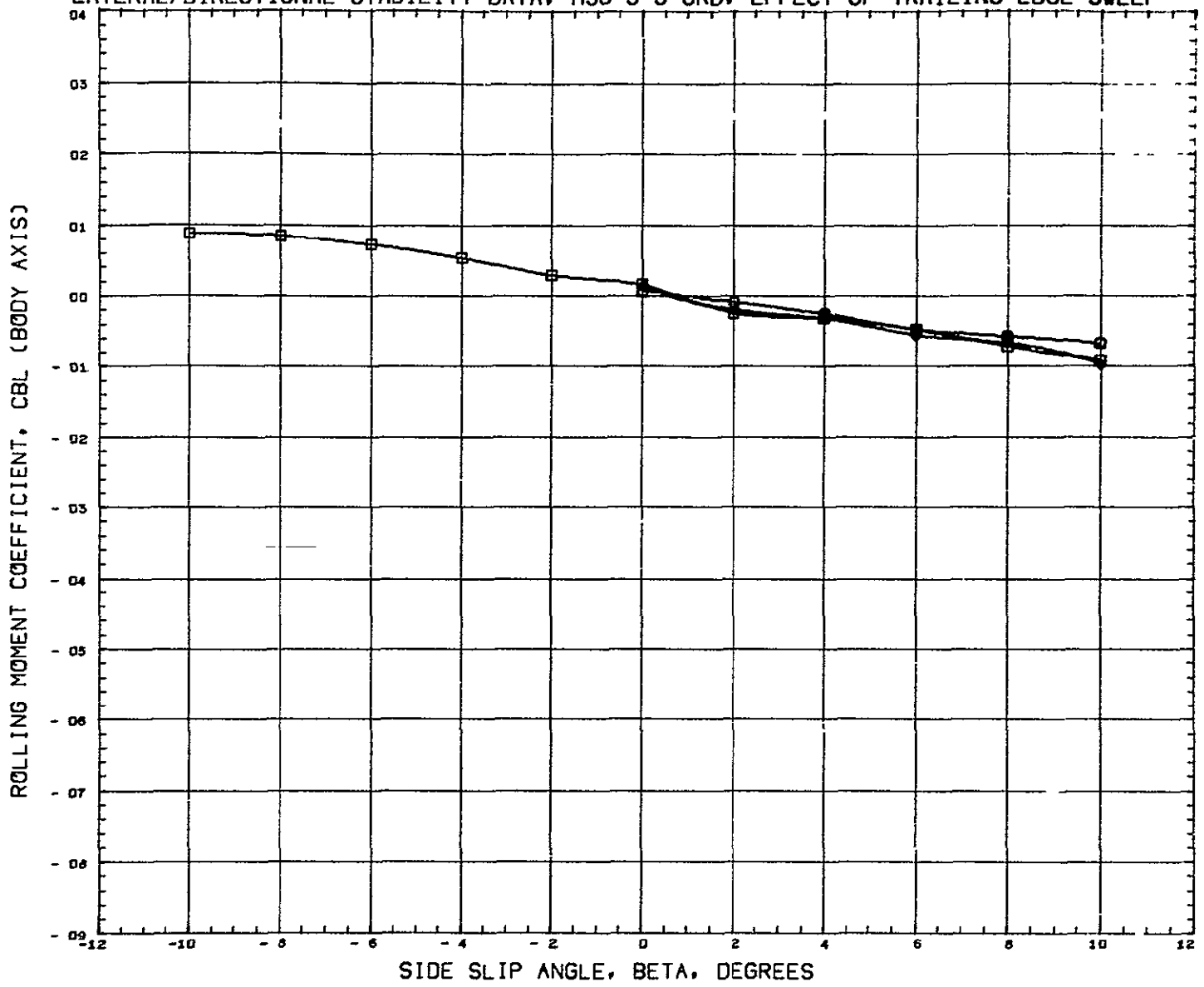


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	1.000	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

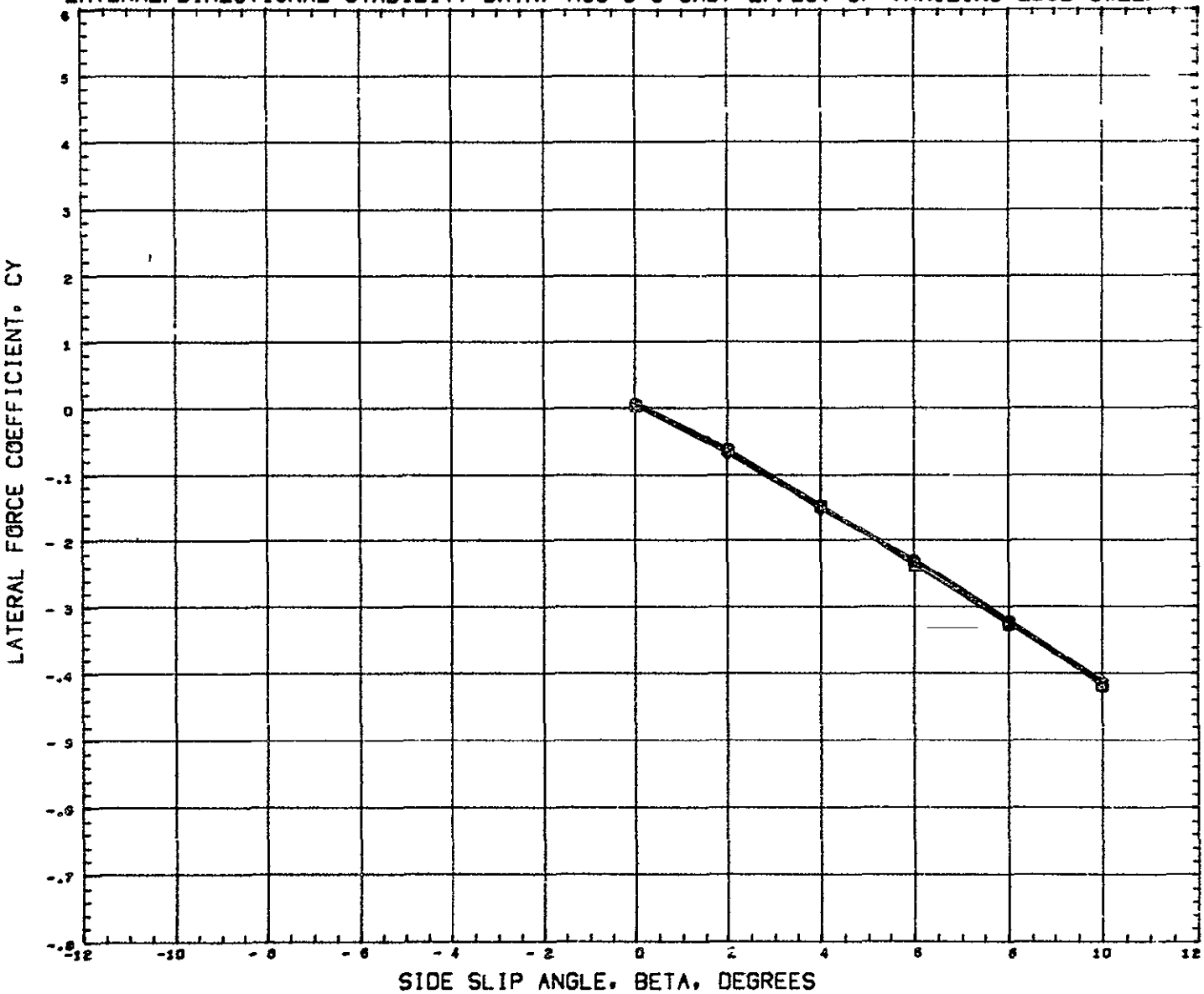


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	1.000	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRF	15.5200	IN
YMRF	0.0000	
ZMRF	2.4000	IN
SCALE	1.6750	PCT

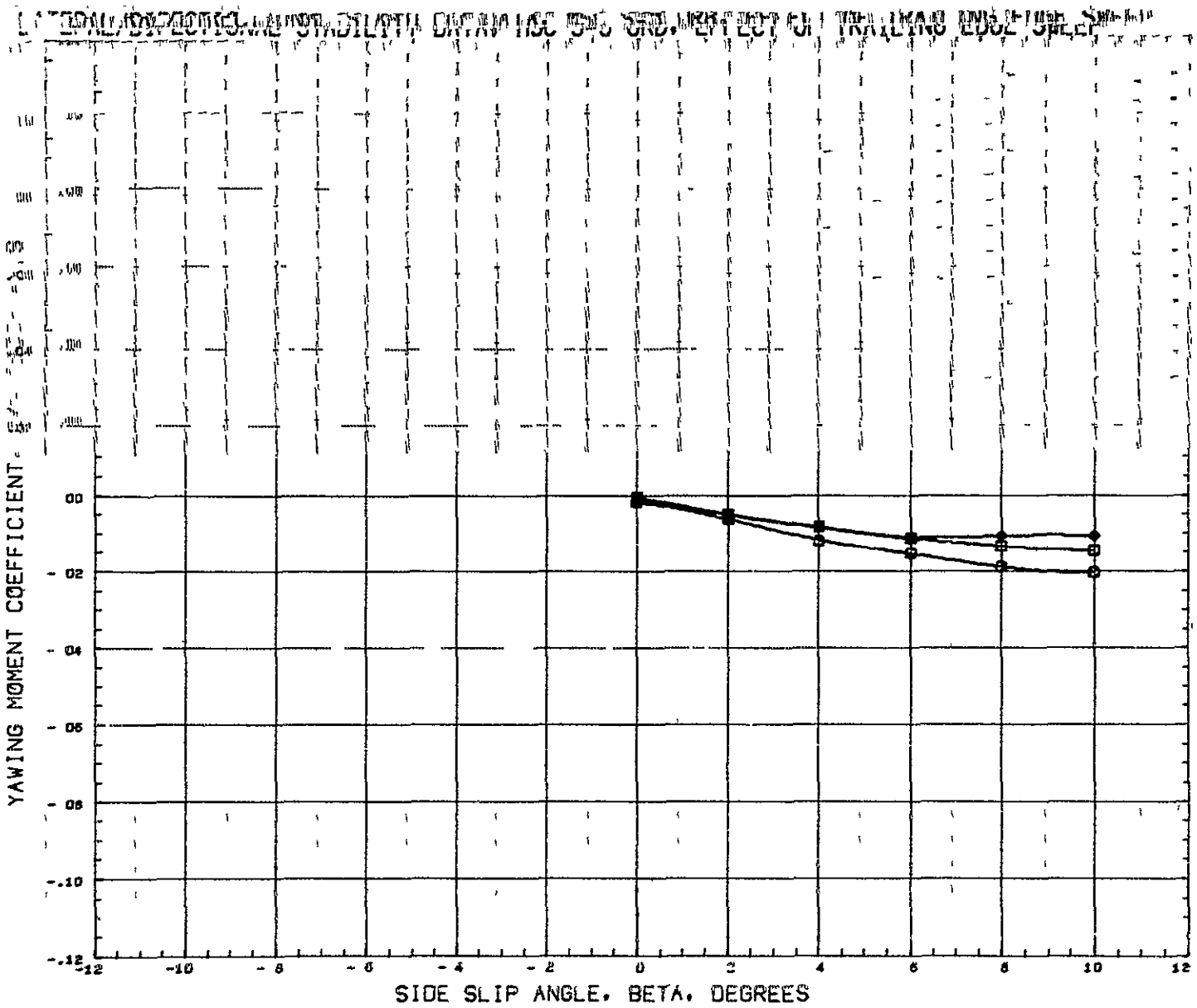
LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	1.000	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

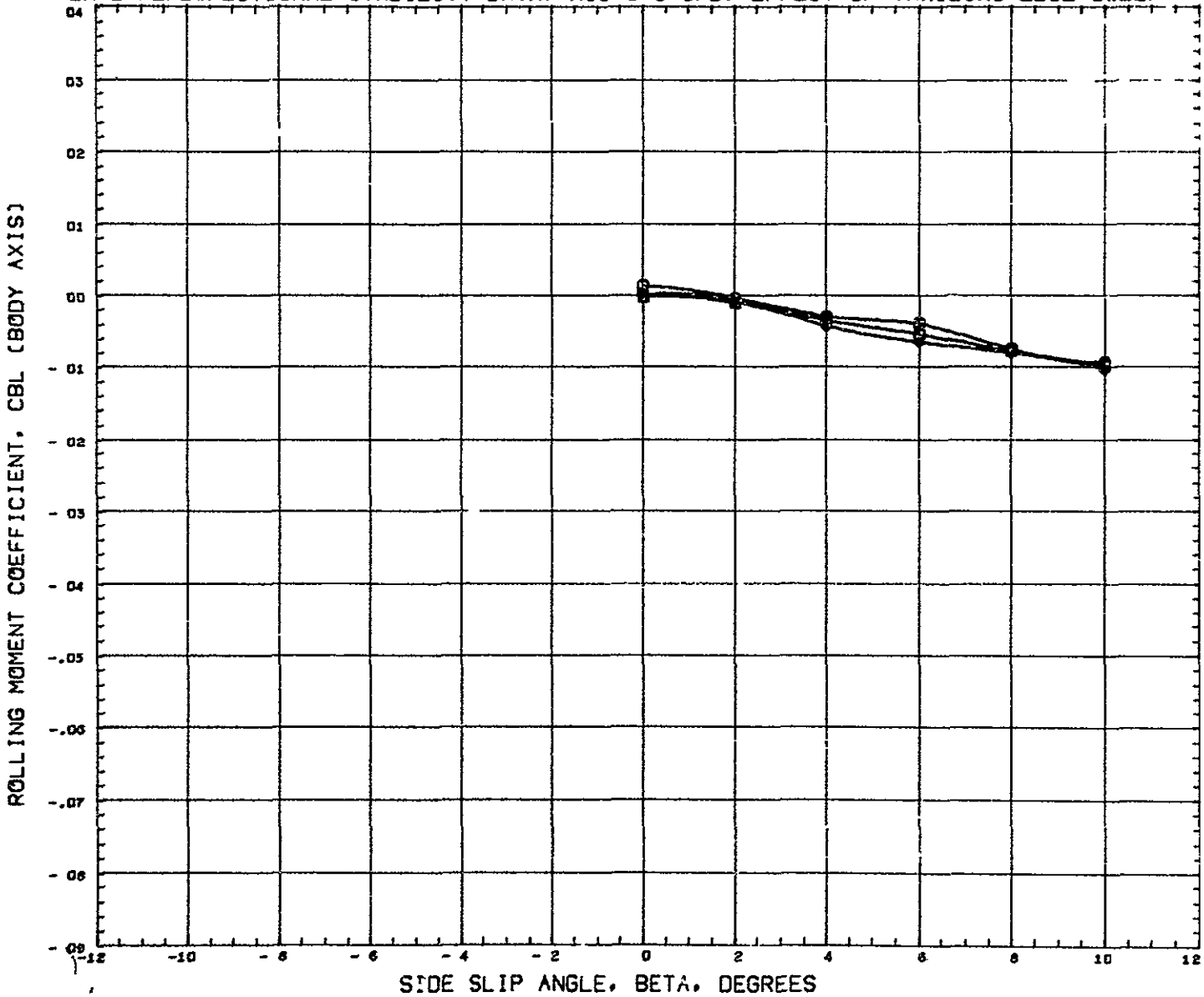


SYMBOL	TSWEEP		PARAMETRIC VALUES			
△	0 000	MACH	0 250	AREA	200 000	
□	15 000	ASPECT	1 000	LSWEEP	30 000	
◇	30 000	ALPHA	2 000			

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



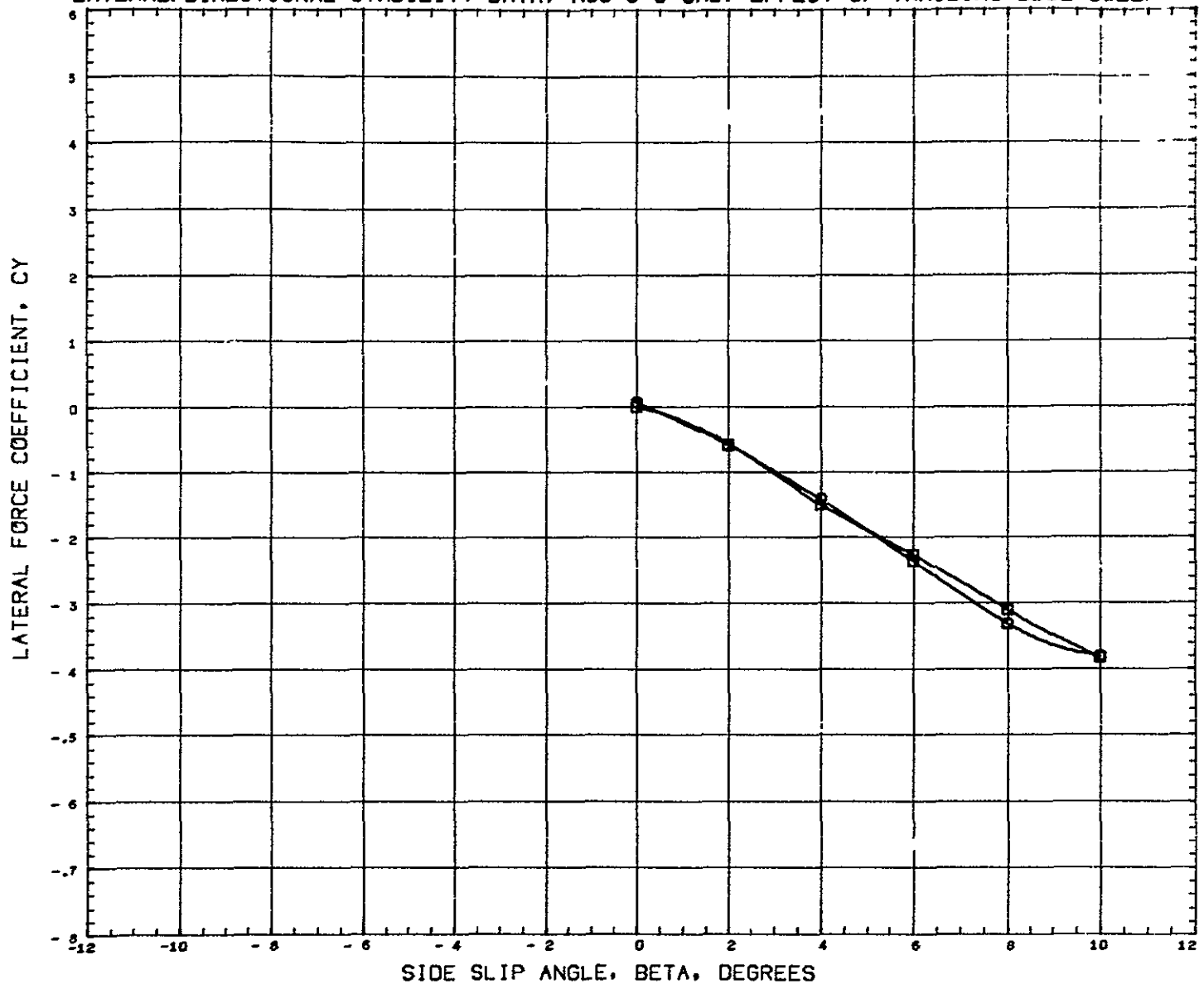
SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	1.000	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
O	0 000
□	15 000

PARAMETRIC VALUES

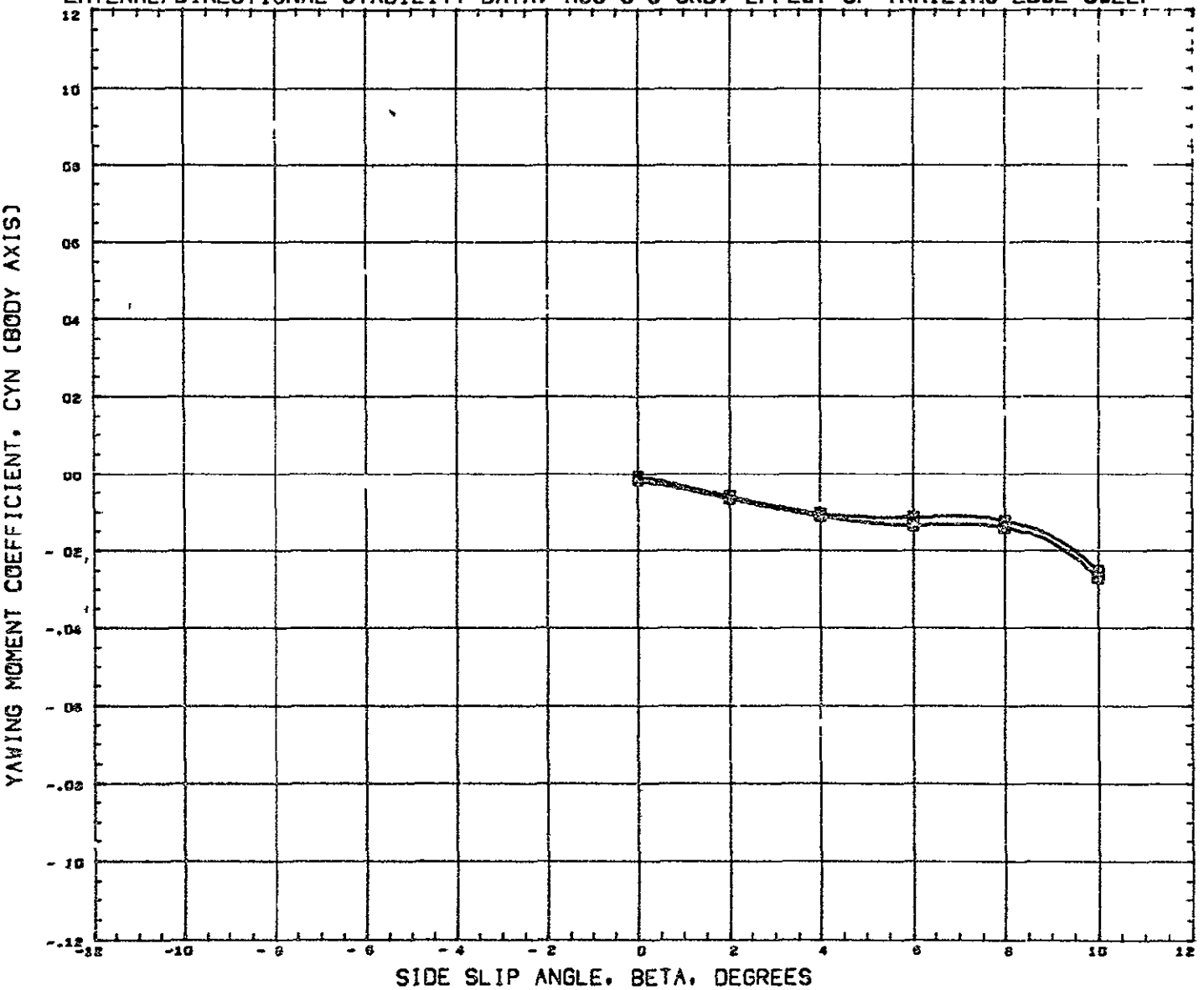
MACH	0 250	AREA	200 000
ASPECT	1 000	LSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



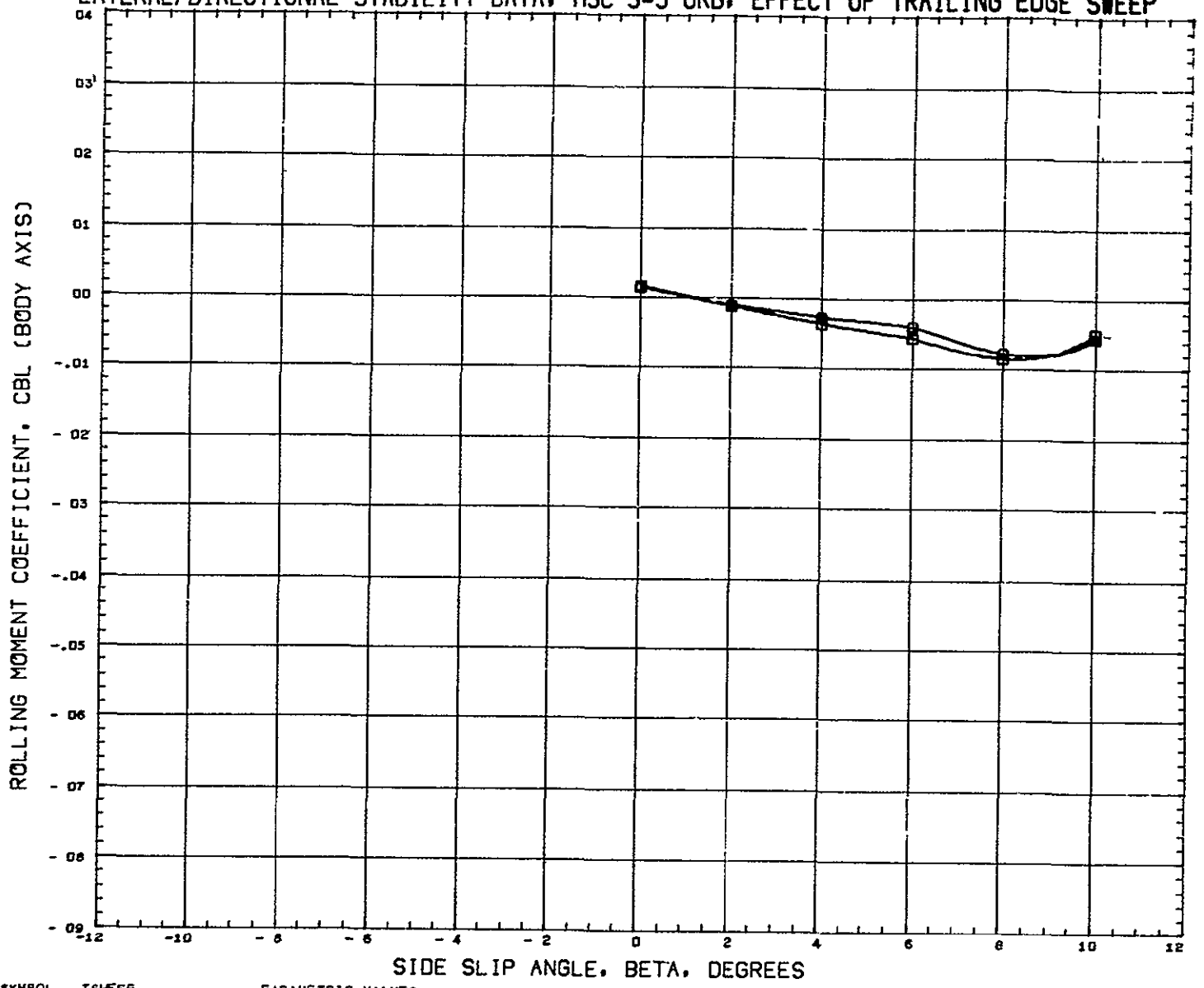
SYMBOL	TSWEEP		PARAMETRIC VALUES		
O	0 000	MACH	0 250	AREA	200 000
□	15 000	ASPECT	1 000	LSWEEP	15 000
		ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
O	0.000
□	15.000

PARAMETRIC VALUES

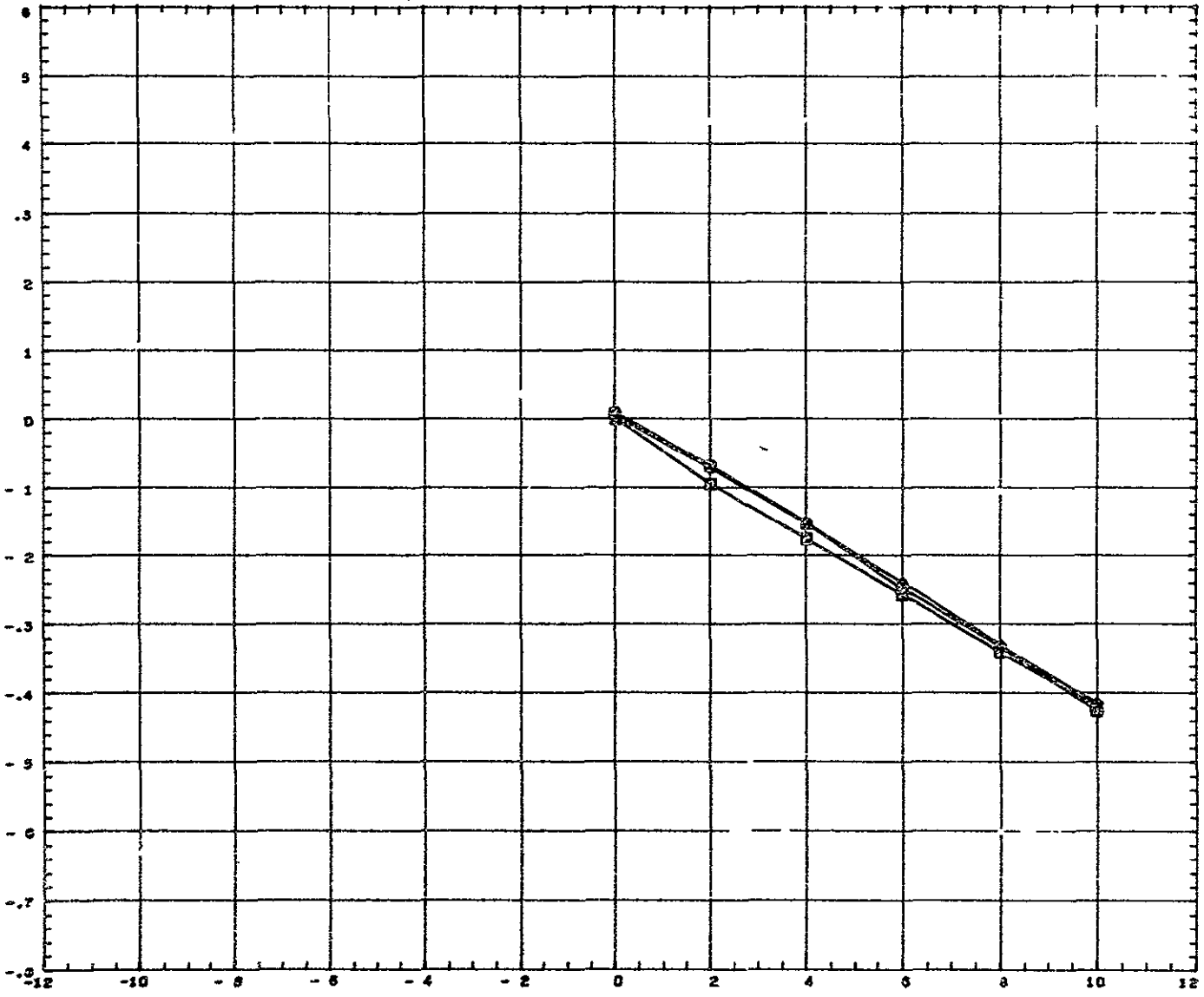
MACH	0.250	AREA	200.000
ASPECT	1.000	LSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

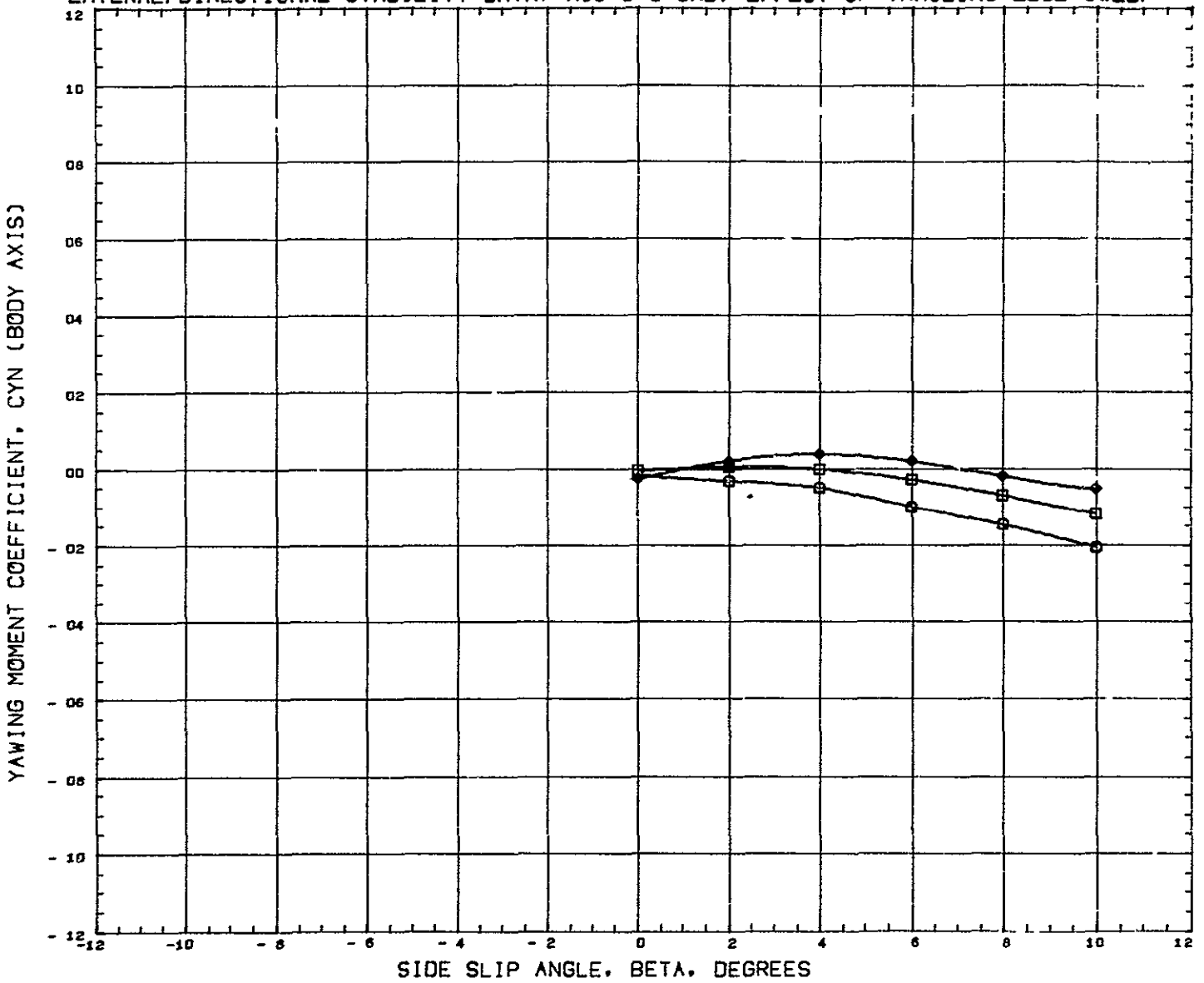


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0 000	MACH	0 250	AREA	200 000
□	15 000	ASPECT	2 000	LSWEEP	45 000
◇	30 000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

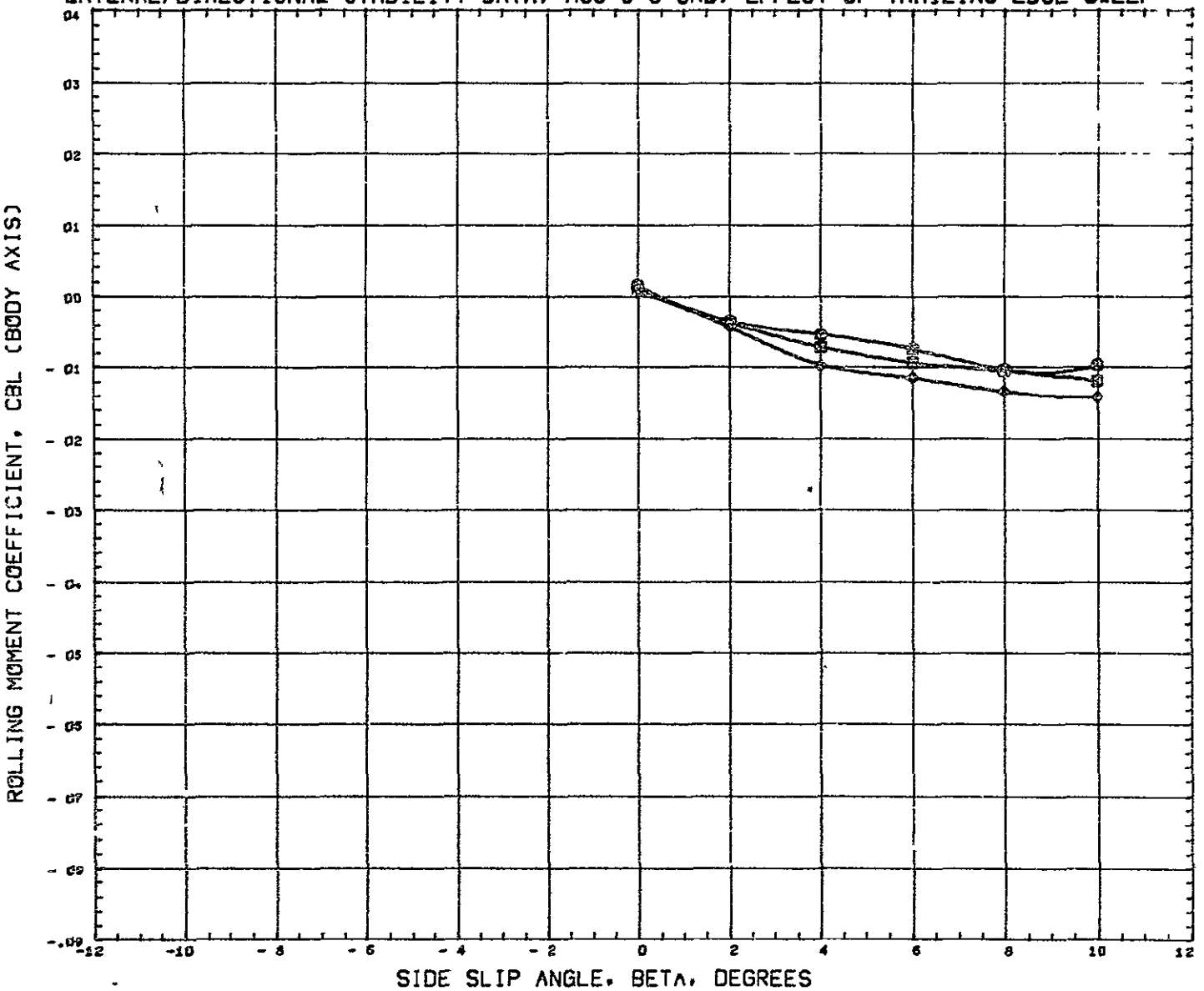


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0 000	MACH	0 250	AREA	200 000
□	15 000	ASPECT	2 000	LSWEEP	45 000
◇	30 000	ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

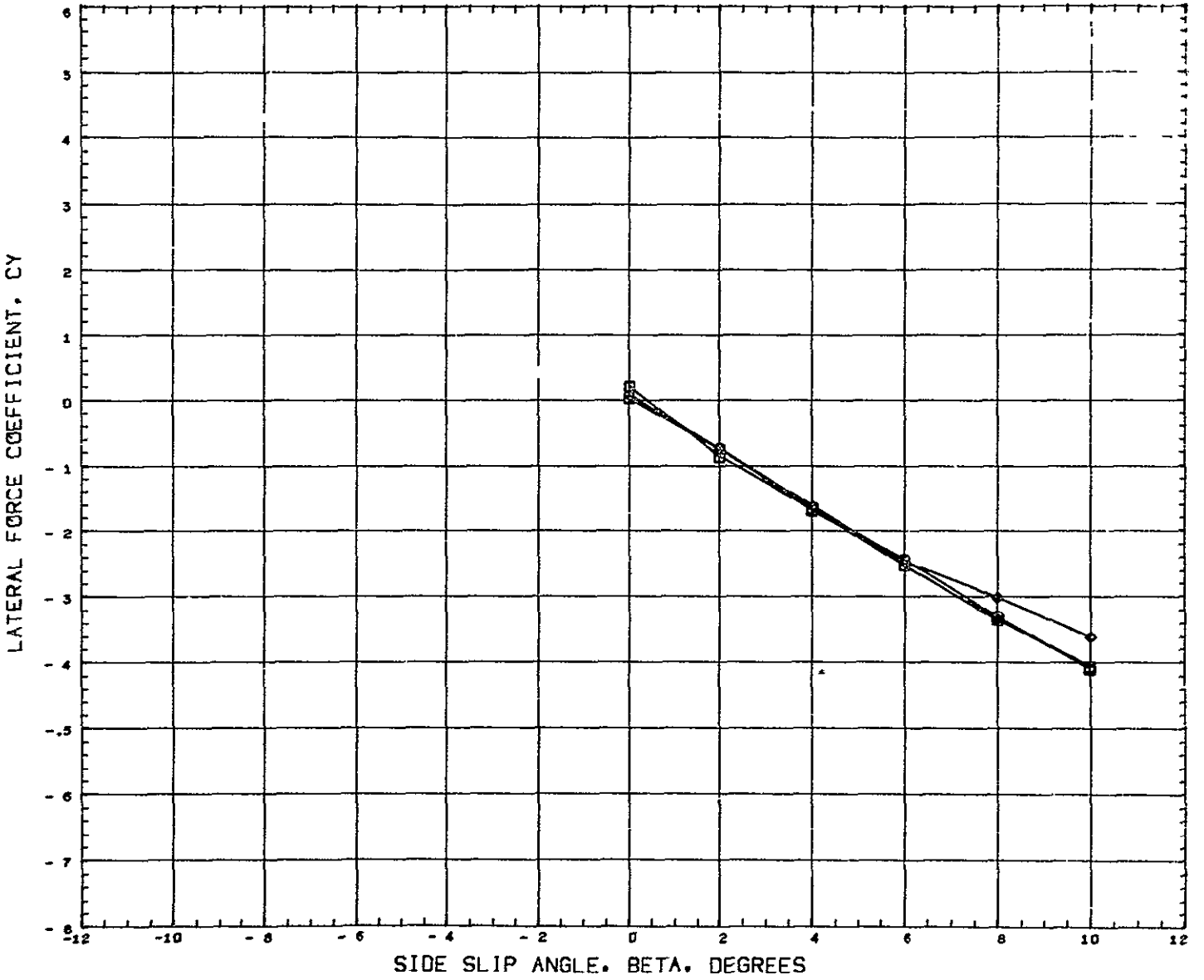


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	.5.000	ASPECT	2.000	LSWEEP	45.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

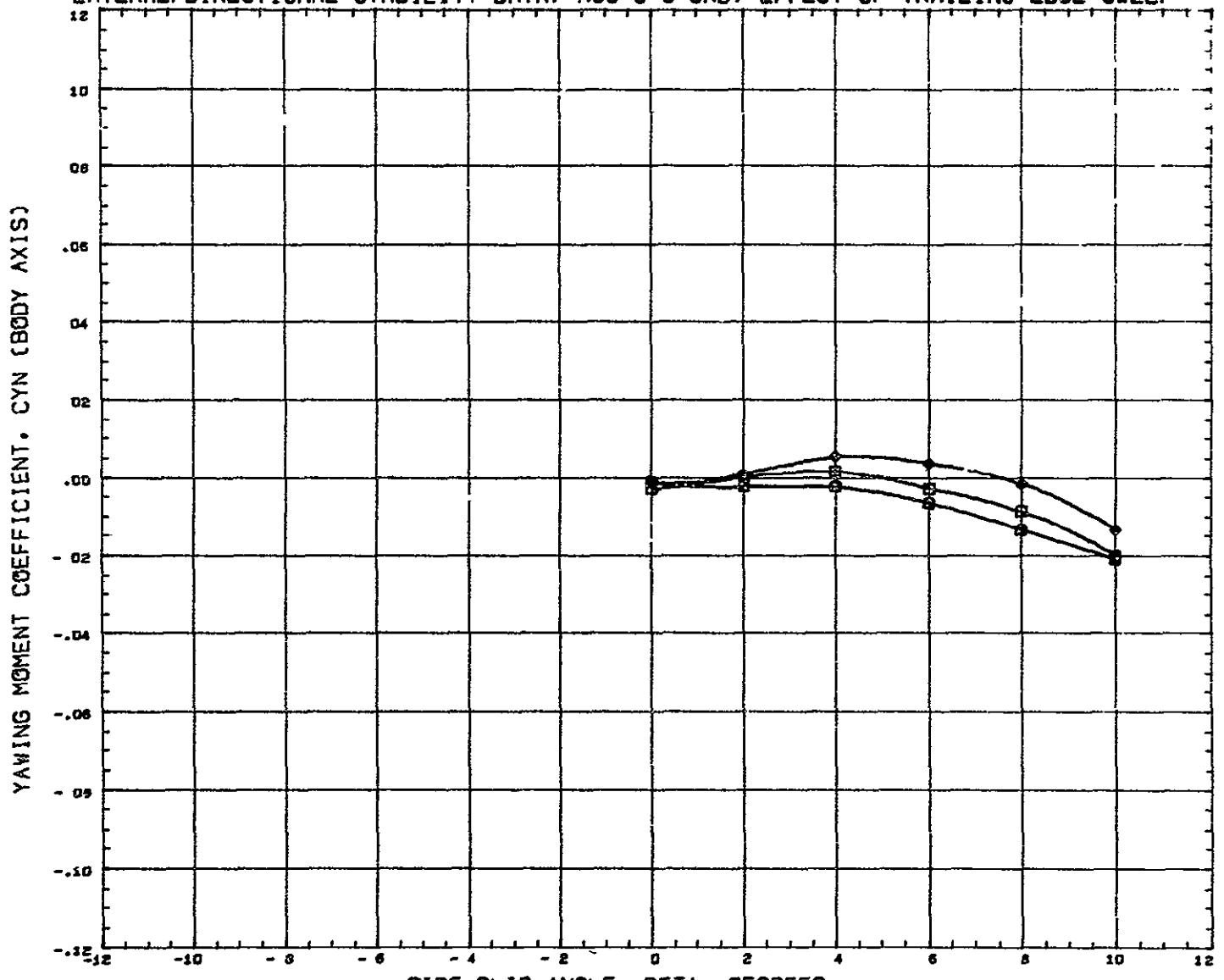


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	2.000	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	N
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

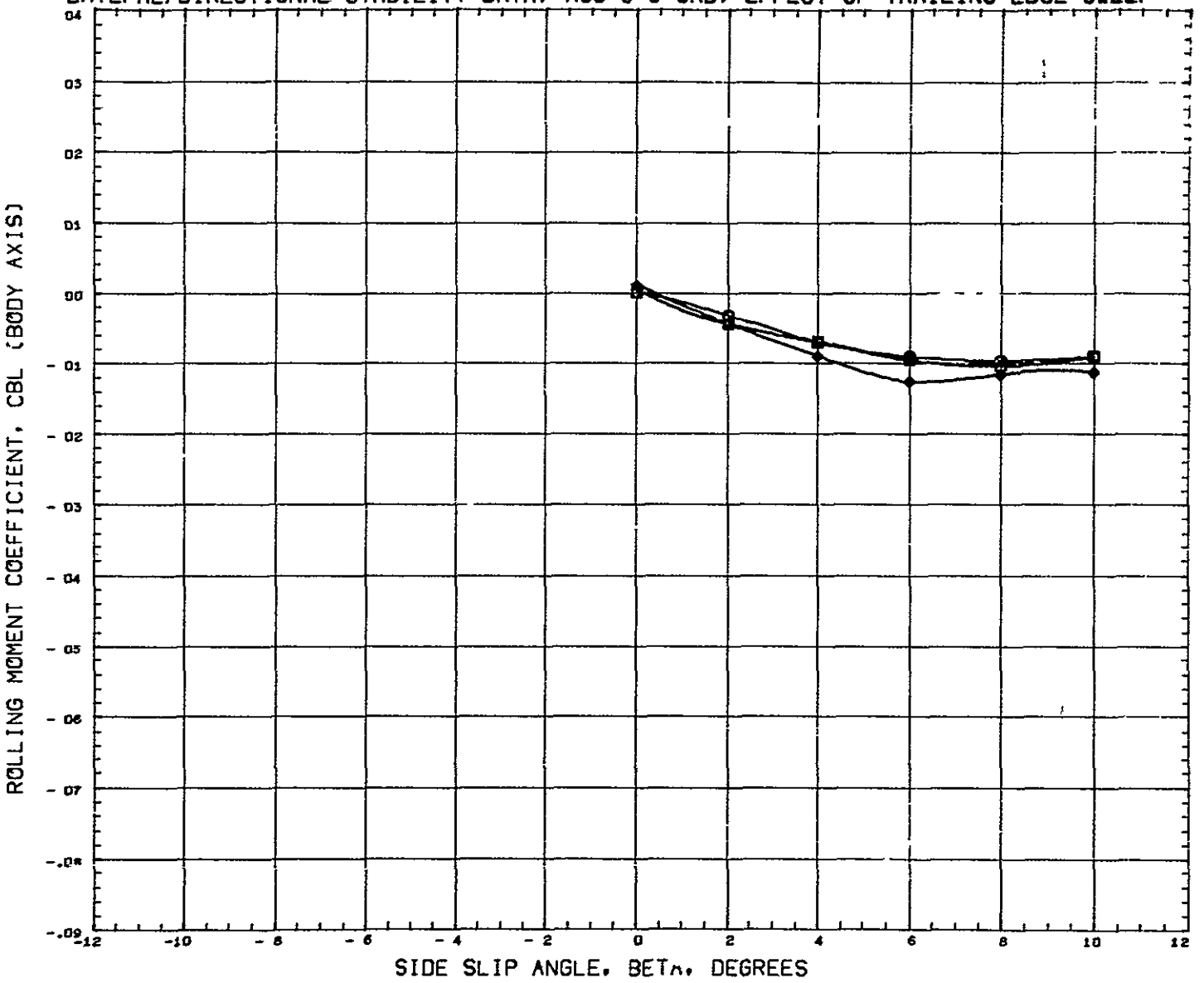


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	2.000	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

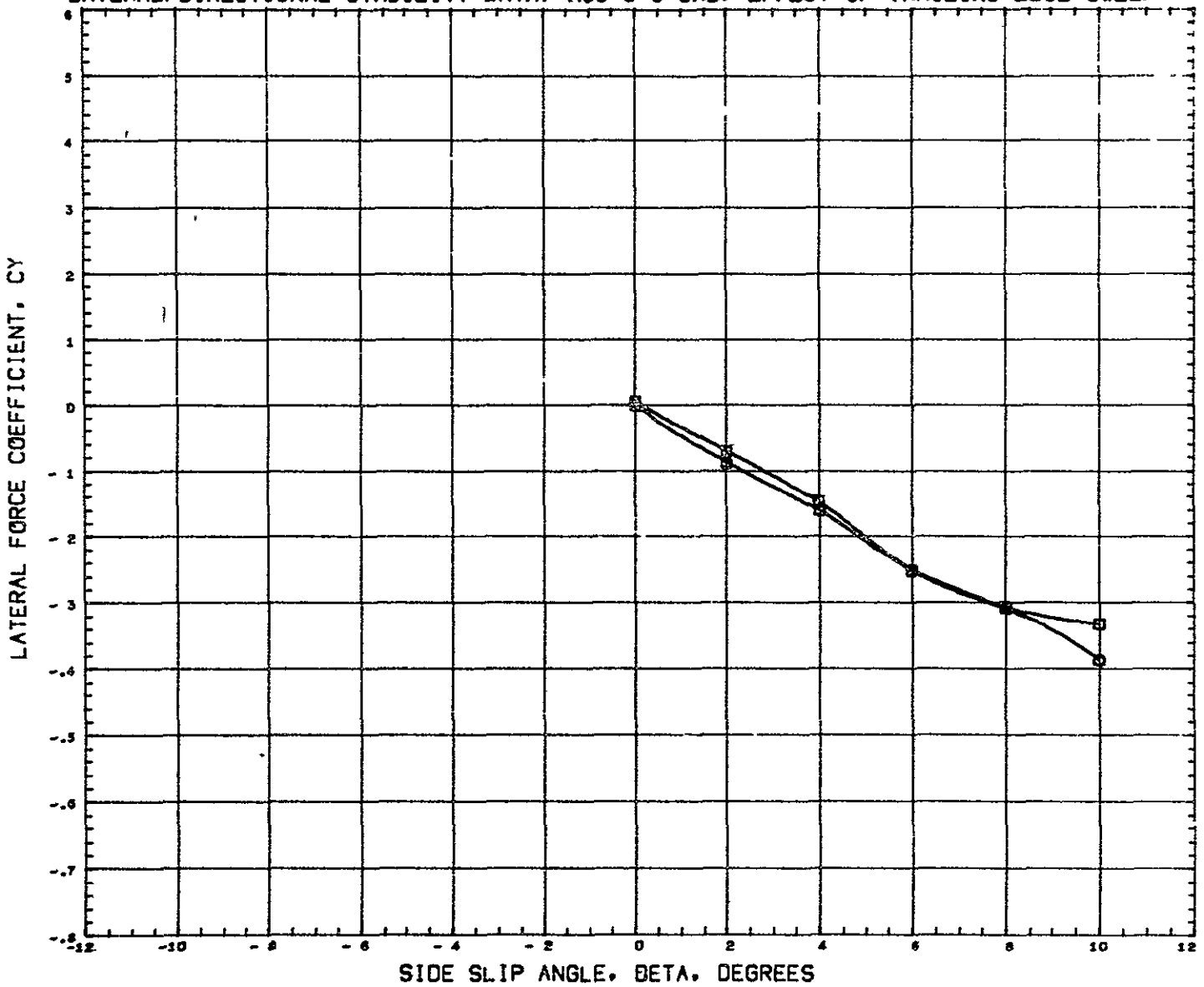


SYMBOL	TSWEEP		PARAMETRIC VALUES		
○	0.000	MACH	0.250	AREA	200.000
□	15.000	ASPECT	2.000	LSWEEP	30.000
◇	30.000	ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
○	0.000
□	15.000

PARAMETRIC VALUES

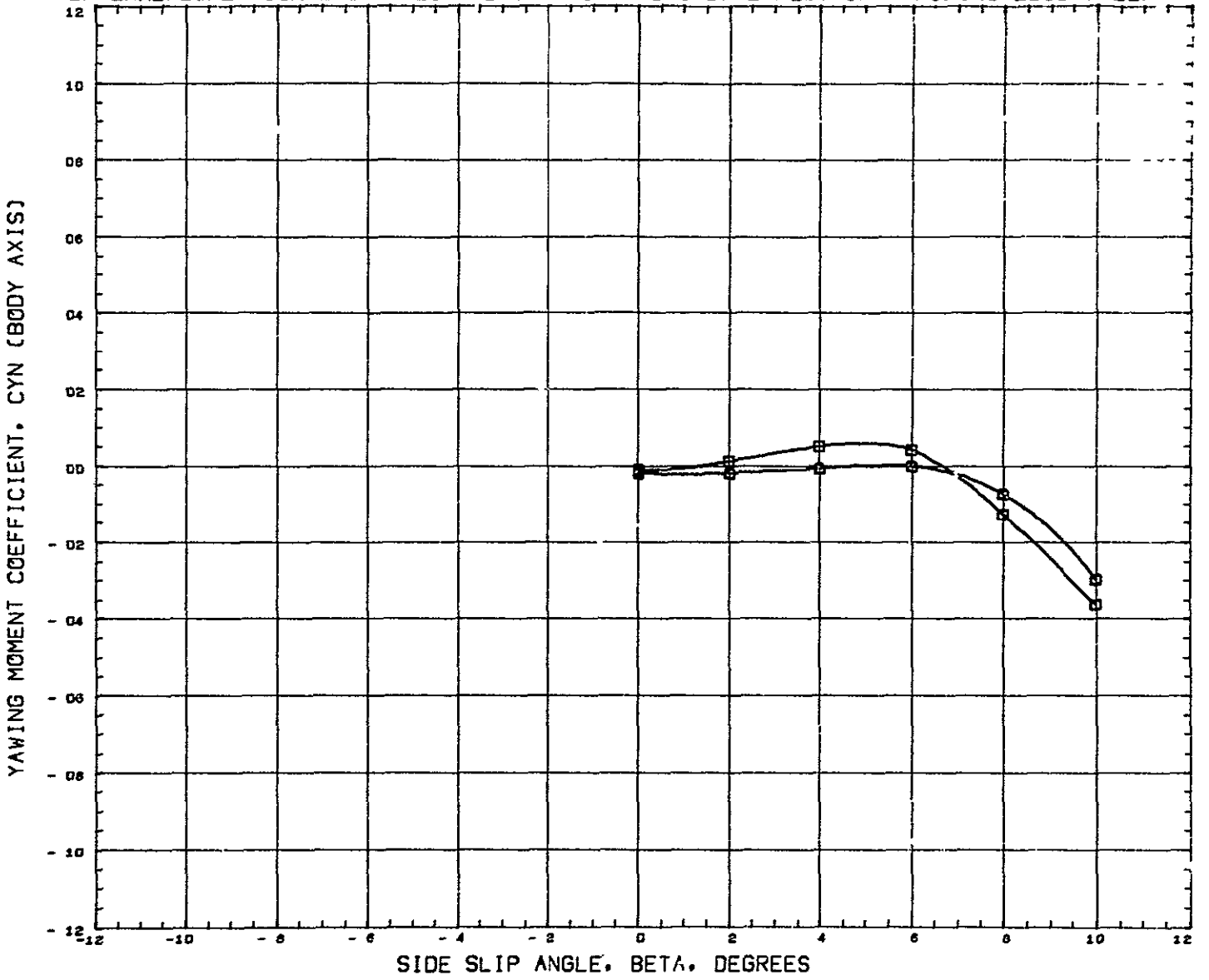
MACH	0.250	AREA	200.000
ASPECT	2.000	LSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP

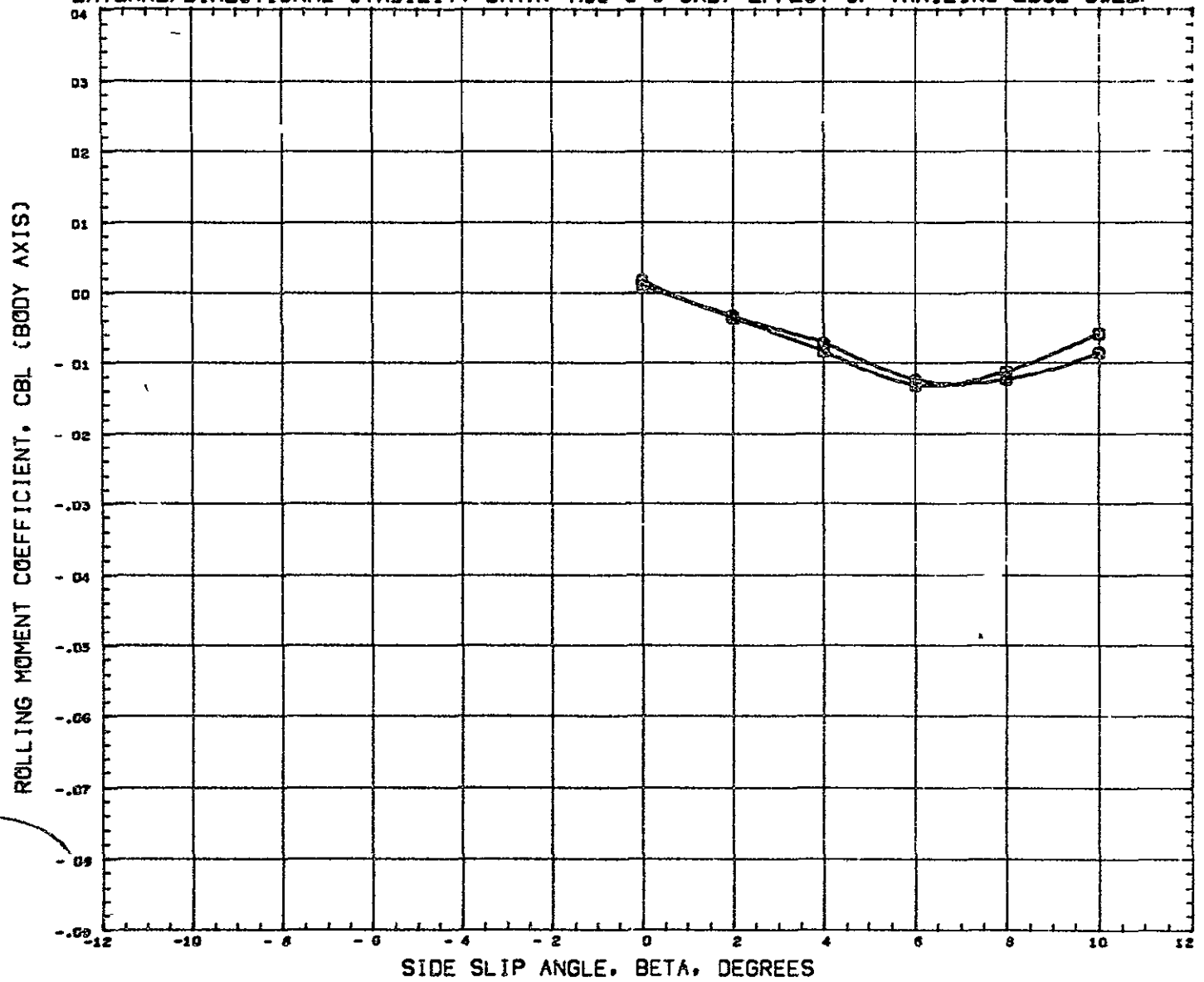


SYMBOL	TSWEEP		PARAMETRIC VALUES			
□	0 000	MACH	0 250	AREA	200 000	
□	15 000	ASPECT	2 000	LSWEEP	15 000	
		ALPHA	2 000			

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, EFFECT OF TRAILING EDGE SWEEP



SYMBOL	TSWEEP
O	0.000
□	15.000

PARAMETRIC VALUES

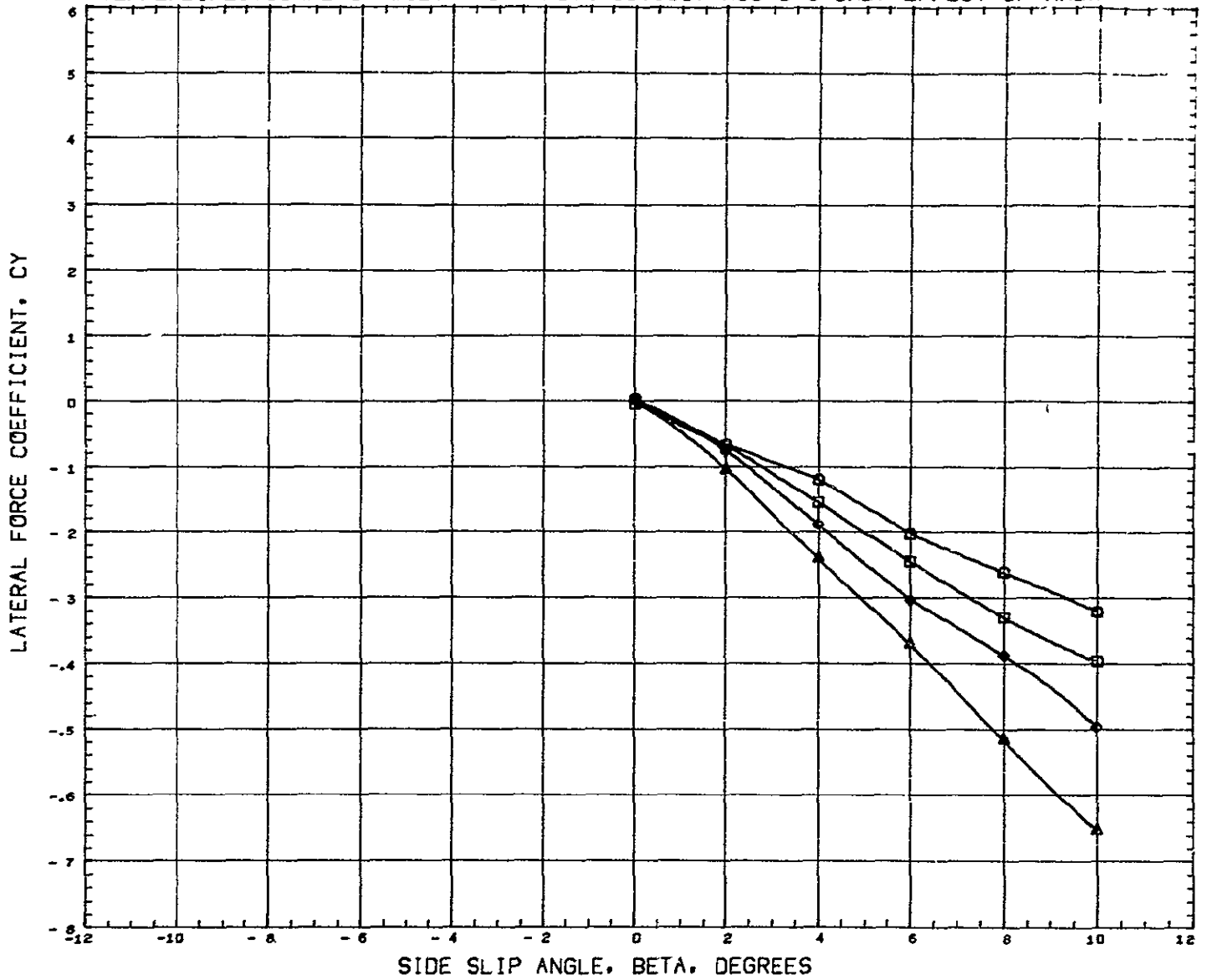
MACH	0.250	AREA	200.000
ASPECT	2.000	LSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	FCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	100.000
□	200.000
◇	300.000
△	500.000

PARAMETRIC VALUES

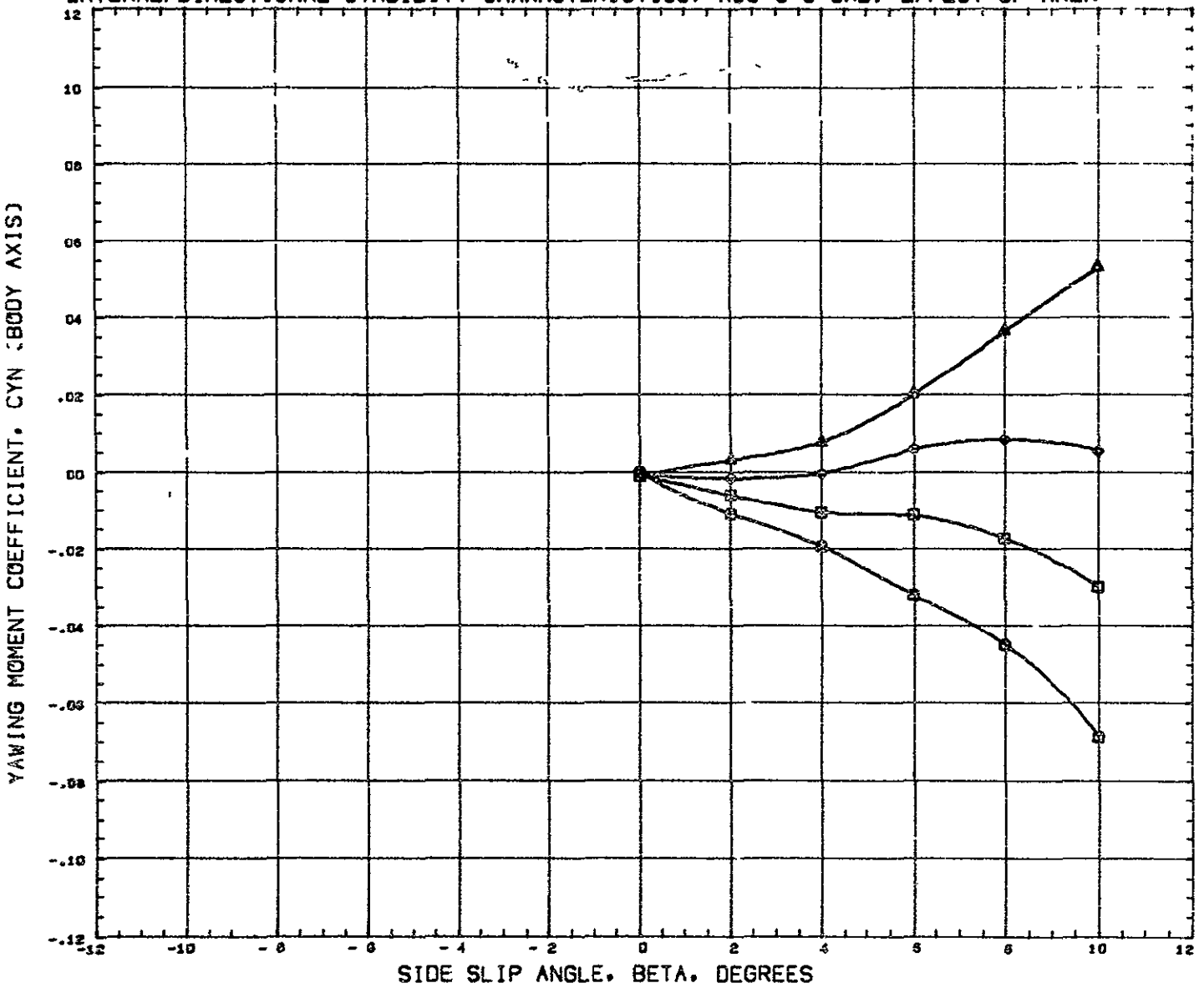
MACH	0.250	ASPECT	1.000
LSWEEP	0.000	TSWEEP	0.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
□	100 000
⊡	200 300
◇	300 000
△	500 000

PARAMETRIC VALUES

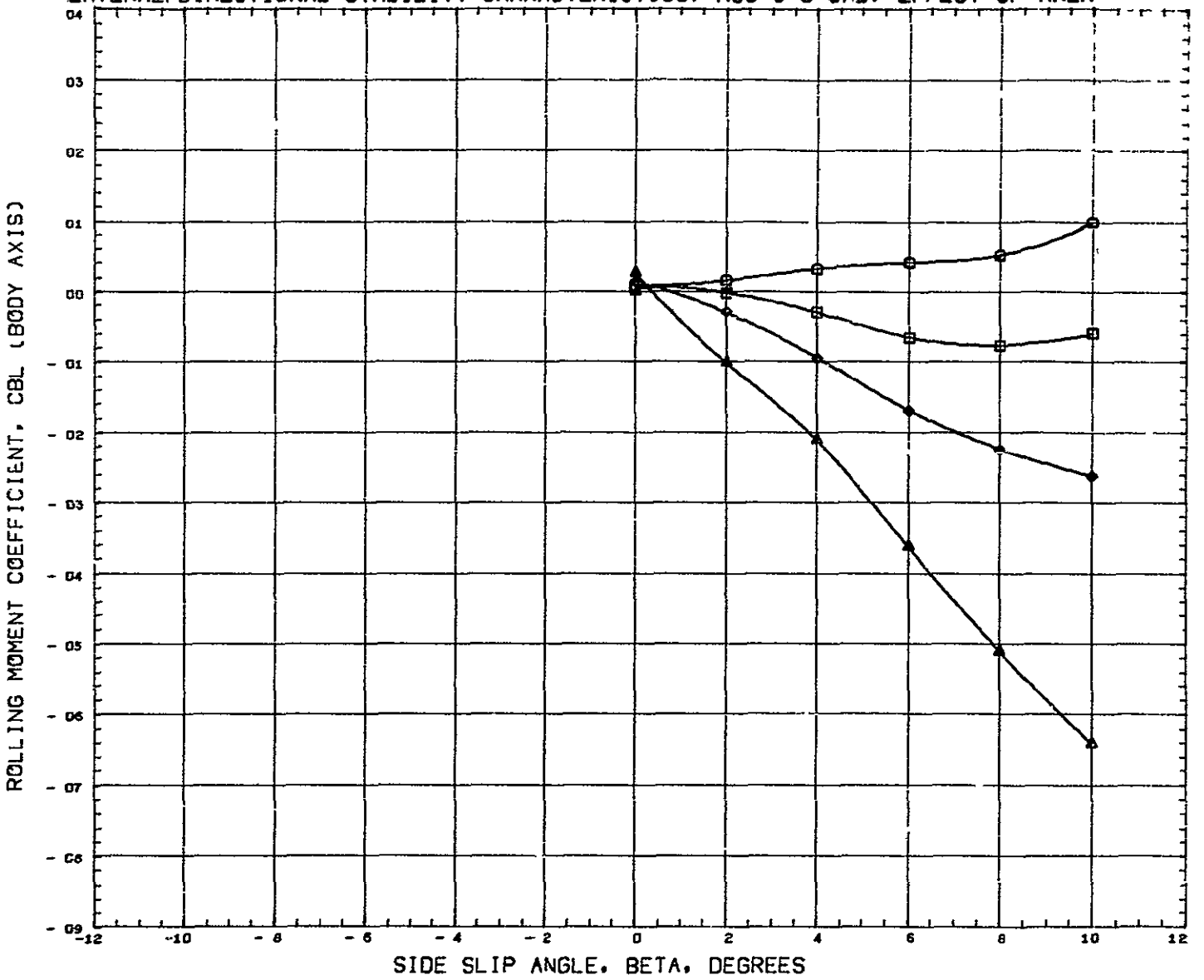
MACH	0 250	ASPECT	1 000
LSWEEP	0 000	TSWEEP	0 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1.6750	PCT

LATERAL/DIRECTIONAL STABILITY CHARACTERISTICS, MSC S-5 ORB, EFFECT OF AREA



SYMBOL	AREA
○	100.000
□	200.000
◇	300.000
△	500.000

PARAMETRIC VALUES

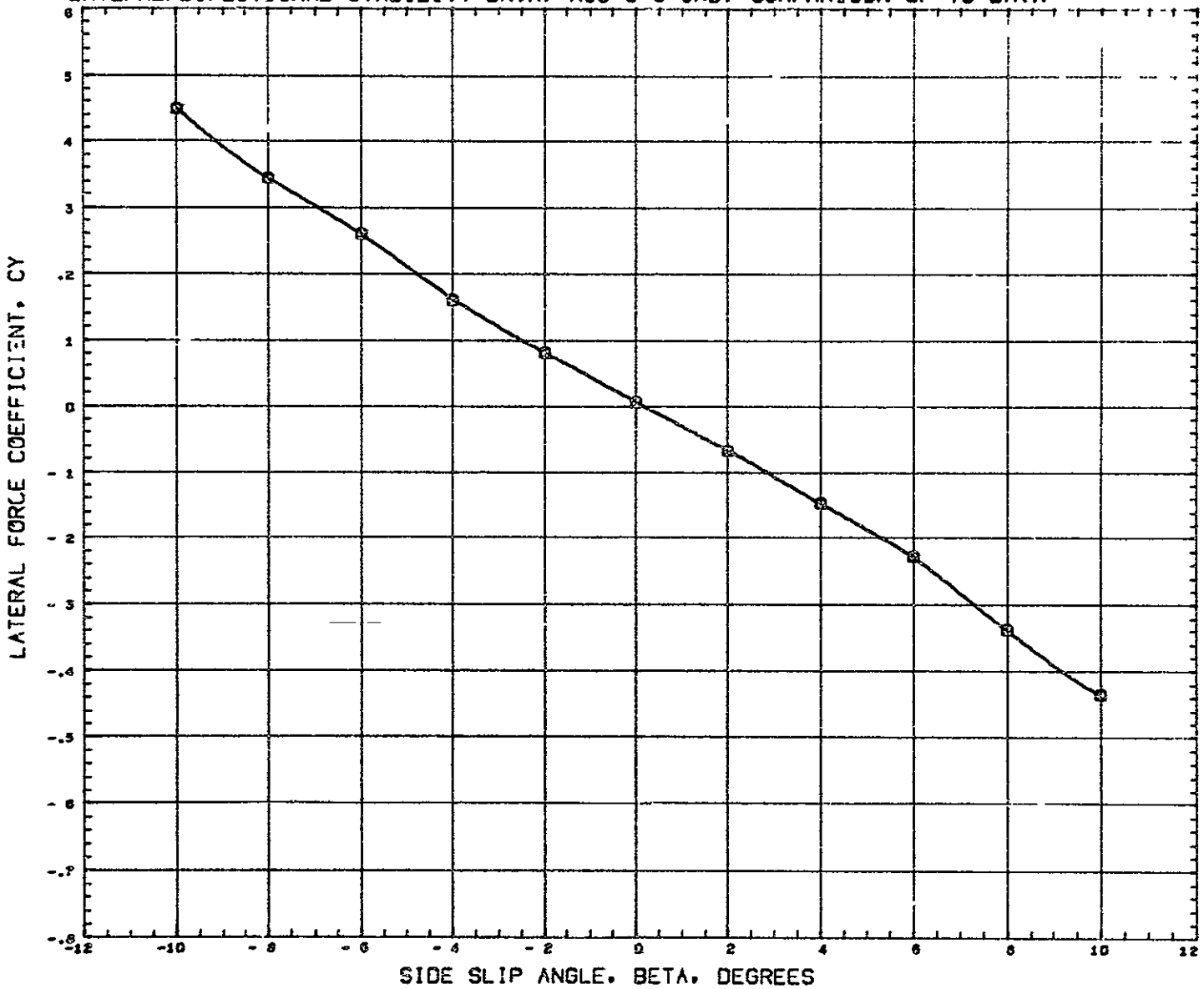
MACH	0.250	ASPECT	1.000
LSWEEP	0.000	TSWEEP	0.000
ALPHA	2.000		

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

REFERENCE FILE

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, COMPARISON OF V3 DATA



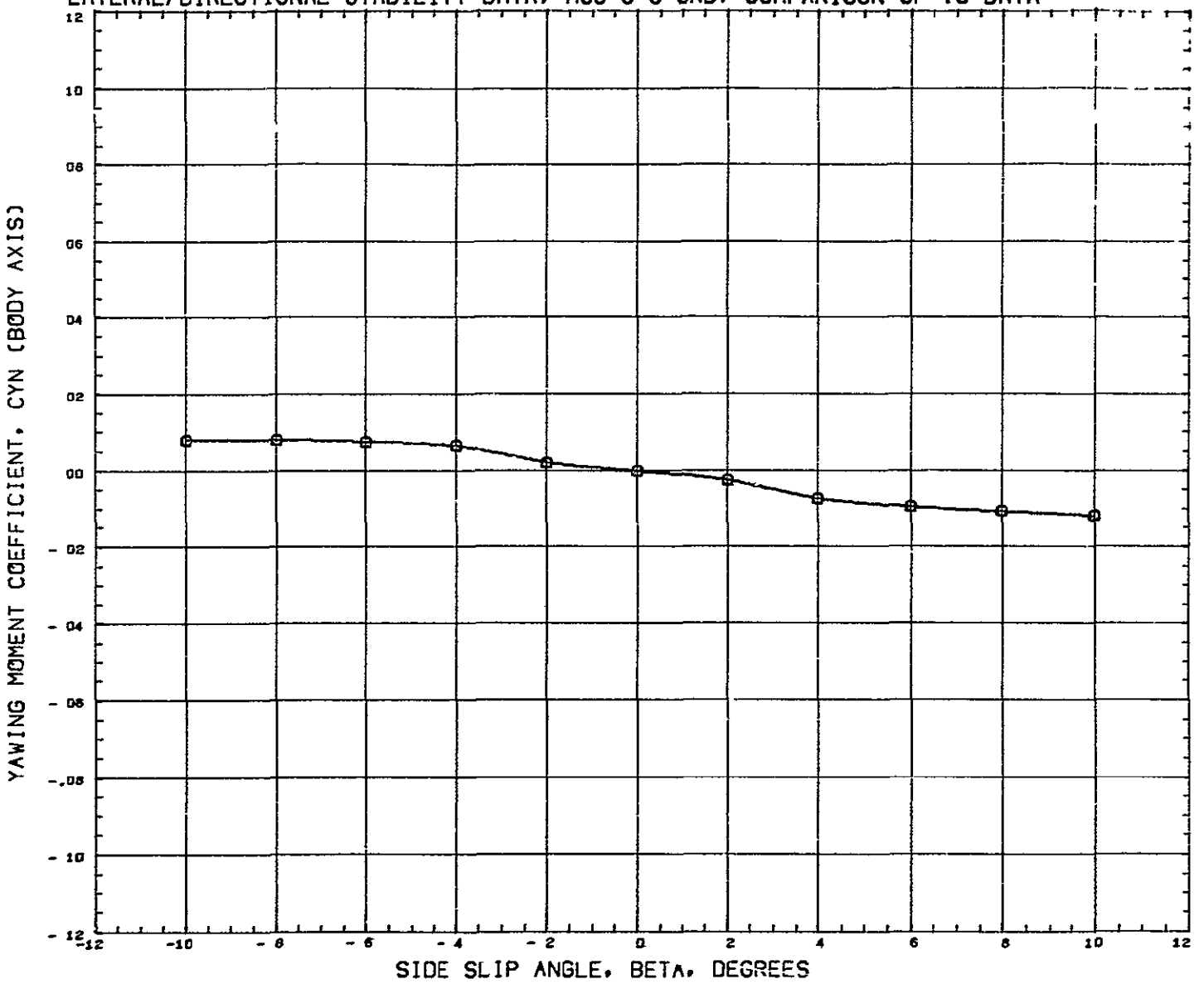
SYMBOL	MACH		PARAMETRIC VALUES		
O	0.250	AREA	241.200	ASPECT	0.980
		LSWEEP	45.000	TSWEEP	15.000
		ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION		
REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

⊕ Σ

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, COMPARISON OF V3 DATA



SYMBOL	MACH
O	0 250

PARAMETRIC VALUES

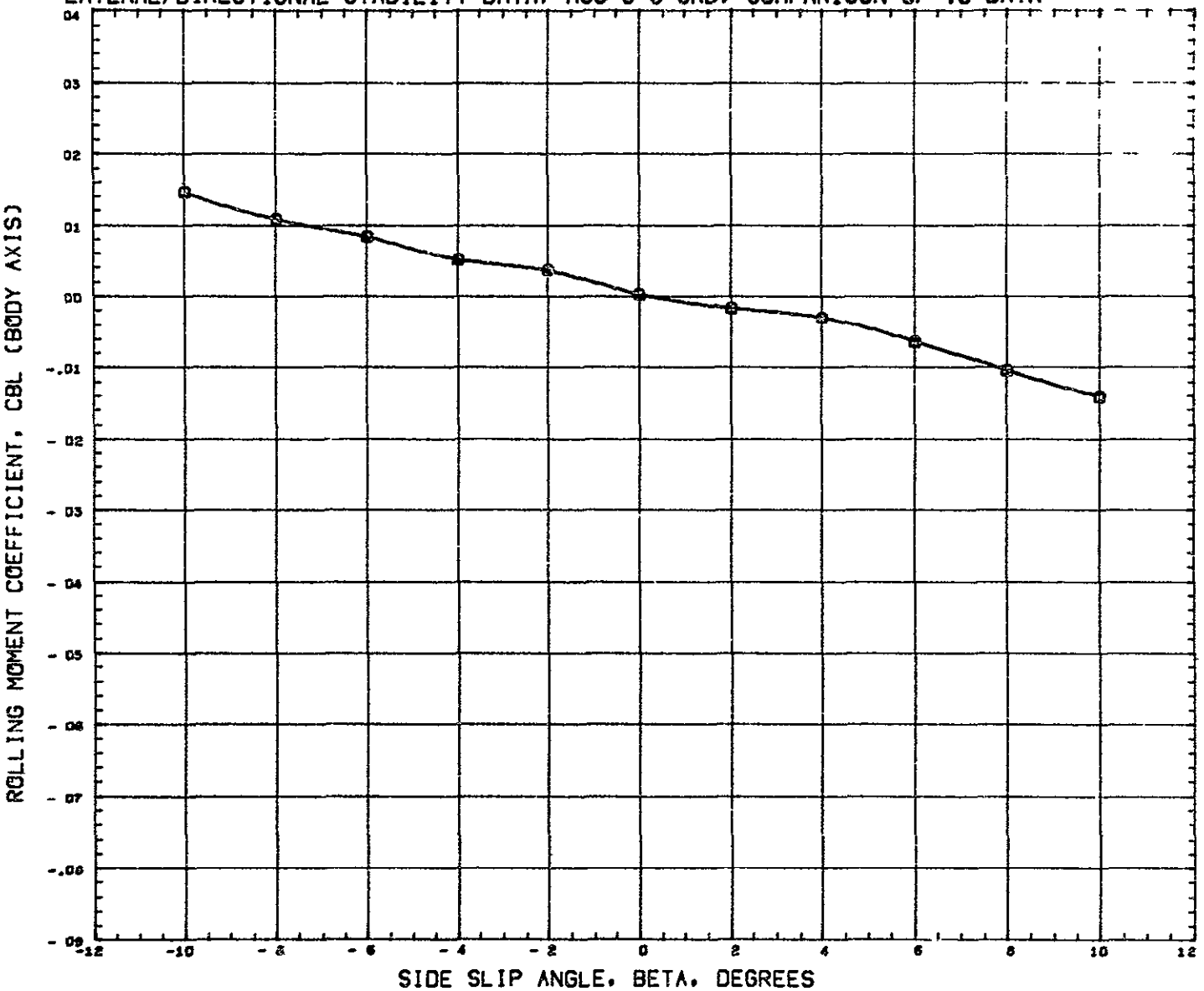
AREA	241 200	ASPECT	0 980
LSWEEP	45 000	TSWEEP	15 000
ALPHA	2 000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0 3210	SQ FT
REFL	0 2300	FT
REFB	1 5000	FT
XMRP	15 5200	IN
YMRP	0 0000	
ZMRP	2 4000	IN
SCALE	1 8750	PCT

LATERAL/DIRECTIONAL STABILITY DATA, MSC S-5 ORB, COMPARISON OF V3 DATA



SYMBOL	MACH
O	0.250

PARAMETRIC VALUES

AREA	241.200	ASPECT	0.980
LSWEEP	45.000	TSWEEP	15.000
ALPHA	2.000		

REFERENCE FILE

REFERENCE INFORMATION

REFS	0.3210	SQ FT
REFL	0.2300	FT
REFB	1.5000	FT
XMRP	15.5200	IN
YMRP	0.0000	
ZMRP	2.4000	IN
SCALE	1.8750	PCT

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